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EDITOR'S NOTES.

Pigs for Sale.—One fine Berkshire boar, five sows, and 24 suckers for sale. For particulars, apply to Mr. G. Berthoud, manager, Experimental Farm, Hamel.

Poultry for Sale.—The manager of the Government Experimental Farm at Hamel advises that he has some very fine white wyandottes for sale, consisting of one rooster, one cockerel, seven hens, and forty chickens. For particulars, apply direct to Mr. G. Berthoud, the manager.

Prepare for Lucerne.—Lucerne will not grow on what is termed thin land. It must be deep and have lime and humus; but by growing cow peas on thin soils for two years and applying about twenty bushels of unslaked lime per acre in the autumn, thin soils may be made strong enough to feed lucerne.

Poultry Tonic.—The best of all iron tonics for poultry is that known as "Douglas Mixture," and is composed of ½lb. of sulphate of iron and 1oz. of sulphuric acid dissolved in two gallons of water, and given to the birds at the rate of two tablespoonsful to a pint of their drinking water. It is the best safeguard against roup, besides being a splendid tonic, bracing up poultry generally.

Potato Moth.—Complaints are being received by the Department of the ravages of the potato moth (*Lita solanella*, Boisd), growers finding it very difficult to keep tubers for any length of time after being dug. A good plan is to spray well with Paris Green, 1oz. to 12 gallons of water, as soon as dug, picking out all potatoes showing any signs of having been attacked, then allowing the solution to dry before bagging or storing. Bag the potatoes as quickly as possible after digging, so as to keep them out of reach of the moth.

Mohair.—Returns from the Government Experimental Farms show that the clip from the few Angora goats on the Chapman farm averaged 3½lbs., and was sold for 9d. per lb. From Narrogin the yield was half-a-pound lighter; this is explained by the fact that only the best hair was taken for use in the farm's exhibits at the late Exhibition, none of it being sold. Better results are expected when heavier clips are put on the market.

Grow your own Nitrogen.—As nitrogen is the one element most lacking in nearly every soil, and as this element is absolutely necessary for the production of crops in general, a system of culture which will furnish this element is very desirable. Leguminous plants, through the bacteria which live on their roots, gather the free nitrogen from the air, where it exists in unlimited supply, but in such a condition that it cannot be utilised by plants. The nitrogen thus gathered is deposited in the seeds, leaves, stems, and roots of the plant. Chemical analysis has shown that from one-fourth to one-half of the nitrogen of these plants is found in the roots, so if the upper part of the plant is removed for forage, there still remains a good supply of nitrogen for the succeeding crop.

Shoulder Galls.—Shoulder galls may be expected to be more common during the hot weather, when horses are likely to sweat freely, than at other times of the year, and therefore increased attention should be paid to the matter of cleanliness. Leather-lined collars are preferable to those lined with flannel or such material, as they do not absorb the moisture so much, and are not, therefore, likely to become so hard as to injure the skin if their condition is properly attended to by being kept clean and dressed if they show signs of becoming hard, which will not often be the case if they are in constant use. A galled shoulder, if not treated in time, is almost certain to develop into a serious trouble; and the first thing to do is to give the animal rest, if possible. If this cannot be arranged for, or even if it is, when the horse resumes work the collar should be padded in such a manner as to avoid pressure on the wound, and a mild dose of physic may be administered to cool the blood and diminish the chance of an abscess forming. Should anything of the kind appear, it is best to invite professional assistance before the evil spreads.

Wheat Yield for 1907.—The acting Government Statistician has issued his forecast of the yield of wheat for grain for the season ending February 28, 1907, as follows:—"Reports having now been received from all the land inspectors in the various wheat-growing districts, I am enabled to submit the following forecast of the season's wheat crop for the State:—The estimated area under wheat for grain, 216,479 acres; total estimated wheat yield, 2,309,354 bushels; estimated average wheat yield per acre, 10·67 bushels. The estimated area to be reaped for grain is, it will be seen, considerably higher than the actual area for the previous season, which was 195,071 acres. As, however, the present season appears to be a less favourable one than that of 1905-6, the total yield promises to be only slightly higher than its predecessor, which amounted to 2,308,305 bushels, whilst the average yield per acre will probably be distinctly lower, last year's average being 11·83 bushels On the assumption that the mean population for the year 1907 will be 265,000, and that the apparent requirements of wheat for food per head of population will be 7·9 bushels, the total amount required for food during 1907 will be 2,093,500 bushels. To this must be added the quantity of seed to be sown for grain and hay during the season, which, on the basis of the experience of recent years, may be roughly estimated at 426,000 bushels. The total amount of wheat required by this State during 1907 will thus be 2,519,500 bushels. According to the preliminary wheat returns for the present season, it appears that the aggregate wheat yield for the whole State is approximately 2,309,354 bushels, thus leaving only 210,146 bushels of wheat or its equivalent in flour that it will be necessary to obtain from outside sources. This may be summarised as follows:—

ESTIMATES FOR 1907.

Mean population	265,000	
Consumption per head of wheat for food	7·9	bushels
Total food requirements	2,093,500	„
Seed requirements	426,000	„
Gross requirements for food and seed	2,519,500	bushels
Preliminary returns of wheat production for season ended February, 1907	2,309,354	„
Estimated requirements from outside sources	210,146	bushels.”

DIPPING FOR SCAB.—The value of dipping sheep as a preventive of scab was very quickly realised in the United States once the officials of the Department of Agriculture induced farmers to try it. Sheep-scab was one of the greatest difficulties the American farmer had to combat, and in 1898 the Department of Agriculture issued a pamphlet giving full information as to the nature and treatment of the malady. In July of 1899 an order was issued requiring that sheep be dipped before they might be moved from one State to another; formulæ for the preparation of dips were also given, and use of one of the officially-approved preparations only was recognised. In 1899 672,944 sheep were dipped, and thenceforward the number increased every year, until last year nearly 17,000,000 of sheep were dipped. Reliable returns received in regard to 6,000,000 sheep in 1904 showed an effective percentage of 99·35. It is doubtful if such a measure of success has ever been achieved in any other country in treating animals for this disease. As the result of this work sheep-scab has almost or quite disappeared from several States that were badly infected, and is much less prevalent in most others.

DESTRUCTIVE BEETLES.—Fruitgrowers have been suffering from the ravages of a Curculio beetle (*Otiorhynchus cribricollis*). This is a small wingless beetle that crawls up the trunk of the trees, eating the bark and buds of young shoots. In a report received from Mr. Geo. Wickens, the Orchard Inspector for the Blackwood District, he states that his attention had been called to the presence of the beetles in an orchard. Poultry are allowed the run of the orchard, and are preventing the pests from spreading. Around all the trees when the soil had been kept loose by cultivation, the fowls had searched most diligently, and scarcely a beetle could be found. Where the ground had not been worked, scratching was a difficult matter, and the poultry had not succeeded in finding the beetles. I have advised hoeing around the remainder of the trees, and also suggested that some food be scattered at the foot of each infected tree to induce the poultry to scratch. The trees are a fair age, and no damage will result if a

few of the surface roots are exposed. I watched the fowls at work, and noticed that they devoured the beetles greedily. The beetles remain only an inch or two below the surface during the day, can neither fly nor hop, and when infesting an orchard spread slowly from tree to tree. Thus their habits render them an easy prey to poultry, and from the result obtaining in the above orchard, I believe the pest can be kept in check in this way.

SMUT IN WHEAT.—The loss to farmers from "smut" and other fungous diseases of wheat, barley, oats, and other grains amounts to millions of pounds every year. The spores or seed of the fungus are on the seed grain which you plant; when the grain sprouts and grows, the fungus grows too; it follows up through the stalk, into the blade and into the ear, and the result is blighted plant, light grains, and a small yield. The same holds true of "scab," which has proved such a blight to the potato crop. The price of a bushel of wheat expended for Formaldehyde (which is the Formaline of commerce) will add several bushels to the next harvest. It takes as much land and labour to raise a light crop as a heavy one. Directions for using Formaldehyde solution: Add the 40 per cent. solution to water in the proportion of one pint to 40 or 50 gallons, and mix well by stirring. Place the grain in heaps on the floor and wet it well with the solution, turning continually with a shovel so as to wet all parts of the grain and prevent loss. Repeat the treatment in a few hours. Barley and oats require a larger quantity of the watery solution, to soak through the chaff. After the second moistening the grain can be planted at once; if not, it should be spread out thin and dried without the least heat. Potato scab may be prevented by soaking the whole potatoes in the diluted solution for two hours. They are then ready to be planted at any time. Formaldehyde in its concentrated form is an active and irritant poison. The mouth, nose, and eyes should therefore be carefully protected when using it, as the strong fumes would irritate them.

PRACTICAL ENSILAGE.—The following has been published in several papers. It is perhaps a little one-sided, but contains a good grain of truth, which should receive careful recognition on the part of our farmers:— "The ensilage system is not the outcome of scientific discovery. It was a French farmer who first adopted ensilage in modern times, but the system is really an ancient one. All science has done has been to explain why the results of ensilage-making are what they are. Every step in the modern system has been practically worked out in experience. There are no experiments in ensilage-making now, for that stage has long been passed. It only remains for farmers to adopt methods suitable for local requirements, and economical in local conditions. If we take the teaching of experience alone as a guide, we shall come to the conclusion that ensilage is likely to be more valuable in Australia than in any other part of the world. In other countries it is necessary to provide cattle not only with succulent fodder, but other drier food. Ensilage, then, only supplies one of the necessary requirements, viz., that of sappy fodder. In our case the greatest and most constant need is to provide additions to sappy fodder—Nature in the main does the rest. Therefore the ensilage system is far more suited to our needs than it is to the needs of the dairy farmer of other countries, who made almost universal use of it. Under these circumstances it is not surprising that our neglect to adopt the practical methods of practical men has resulted in dairy herds giving less than half what they ought to yield, and a half-time system of producing an intermittent output ·calculated to endanger our prospects in our best markets."

Poison in Ducks' Bills.—It is very usual for people to keep ducks in the same yards with their chickens, and then to wonder why the chickens do not thrive. The chickens that are found dead they usually conclude have been crushed, because they present a flattened appearance. It is usual for chickens to appear thus when they have been dead for an hour or two, and this fact often deceives those who find them. In point of fact, ducks should not be kept with any other creature, as the slime from their bills is injurious to every living thing. I have seen a pig at death's door from the fact that the food left by the ducks was poured into the pigs trough. A pig has a very strong stomach and can digest food that would kill a chicken, but at the same time even a pig cannot thrive if asked to eat from the same dish as the ducks. As soon as my ducks arrive home from the lake, they are shut up, and as soon as the sow arrives with her brood from the stubble, she is conducted to her comfortable pen. The geese are also yarded before the gander has time to tease everything within his reach. The chickens are called to roost before the stable doors are opened, so that they cannot roost on the horses and cover them with lice. Everything on the farm should have a place to itself. I have seen a sensitive horse turn from his food in loathing when the clean, sweetsmelling cows were chewing their cud near his manger. However picturesque the creatures appear herded together in the yard, it is the greatest mistake to keep them so, and, above and beyond all, keep the ducks to themselves.

The Divining Rod.—Twenty or thirty years ago if a man even hinted at the possibility of finding an underground stream of water by means of a forked stick cut from the first available bush he would have been looked upon as a fit subject for close medical observation, says the Gulargambone correspondent of the Sydney *Daily Telegraph.* Time has changed all that, and nowadays the men on the land in the drought-stricken areas of the western and far-western divisions of the State recognise in that same forked stick or divining rod one of the best, if not the best, of their silent helpers. The two things needful for the stockowner are grass and water. Too often we hear that So-and-so has plenty of water, but no grass, and *vice versa.* In the latter case the divining rod proves itself to be a most valuable help. This is not a blind statement without a backing, for there are thousands of men on the land in the back country to-day—graduates in the hard school of experience—who affirm positively that if water exists under the ground in any place, the exact spot can be easily located by the aid of the rod, even though there are no surface indications of moisture. The fact that the divining rod does work is now admitted; but no satisfactory reason for its working has so far been given. It is not an impartial worker, for in the hands of one man it may not budge, whereas in the hands of his neighbour it will twist downward despite his endeavours to hold it upright. Those who read this should try for themselves, and if it works, the amount of force developed will be surprising. A forked branch, broken from the nearest green bush, is all you want. Grip the two ends firmly, one in each hand, and hold them before you, the back of the hands up, and thumbs together, so that the fork is over them like an arch. Then walk along slowly. If you are a good subject for the rod's working, and water exists underground in your path, as has been said before, the result will surprise you. At the first indications of water the end of the rod tends to droop earthward, notwithstanding that, if you are at all sceptical about its efficiency, your hands will naturally grip tighter. This will not stop it, however, for if there is water underneath the rod will go down, despite all your efforts, even if the bark is twisted off in your hands in the process. In the Coonamble district there is a man who is reckoned as the King of the Rod thereabouts. For the last ten years he has worked it over the district, and has not had one failure. Not only have stockowners found the rod a boon; but in the townships and hamlets on the banks of the western rivers thousands of wells of good water for household use have been found by its useful agency.

MARKETING WOOL.—In a recent issue of the *British Sheep Breeders' Journal* appeared the following interesting article on the importance of extracting all vegetable matter from wool:—"Vegetable matter in wool has this last eighteen months occupied a very prominent position in the wool world, due to a large extent to its being on the increase. Growers cannot fully estimate how injurious this is, manufacturers alone being able to estimate the importance of keeping fleeces free from everything vegetable in character. Put it down as a well-defined principle that the more vegetable matter there is in shorn fleeces, the more will buyers fight shy of it in the future, besides paying less for it. Wool containing loose hemp, string, straw, short fluffy bits from the inside of tares, means much extra cost in manipulation; while, owing to vegetable matter not taking the dye like wool, has been the direct cause of serious loss arising through spoiled pieces. There are several forms of vegetable matter which wool-growers need to watch with the strictest vigilance. While the fleece is growing there is the vegetable matter which is picked up. In colonial fleeces this is represented by burrs, seeds, and shives. while in English wools the worst feature to contend with is straw. After washing, sheep should never be turned into straw before shearing, while even in the turnip field straw should not be spread unless the land is very heavy and wet. Then there is vegetable matter getting into the fleece while shearing is being conducted, and this should be avoided by the shearing floor being kept entirely free from all extraneous matter. Of course, this can be picked out at the sorting table, but it means increased cost, and this the sheep farmer has to pay by receiving less for his clip. Then there is the worst feature of all, namely, the tying up of fleeces with loose, fluffy jute twine. This practice has nearly disappeared, and the sooner it is a relic of the past the better. It is mostly practised in the south of England, and principally in the counties of Somerset and Devon. Wool fleeces do not need tying with band at all, and the few stations in Victoria, Australia, where it is still done need not continue the practice. Then there is the evil arising from using poor tares. When this is done, the loose, fluffy bits from the inside rub off on to the wool, and no amount of sorting will rid these from the wool. When hemp or jute fibre gets into the wool and passes through the scouring machine, it gets so broken up that it is lost sight of, but it refuses to take the dye as the wool does and injures the appearance of the cloth made from the yarn.

GRASSES ON SAND-PLAINS.

By A. Despeissis.

A practical illustration of the capability of the Eastern District sand-plains was afforded me on Tuesday last.

Making an early start from Northam with Mr. C. R. Knight in his motor car, we soon reached Jennacubbine, 18 miles along the Goomalling road.

The hotel where we stopped for breakfast is situated on the edge of a sand-plain, and Mr. Collins, the proprietor, has already proved there that *paspalum dilitatum* can accommodate itself to the surroundings quite as well as any of the indigenous growth on the uncleared stretch of country on the other side of the fence.

Some stools of that grass, stuck here and there on a sandy ridge, are almost daily run over by teamsters' horses which come up to the well. They have never been watered.

In a small enclosure alongside that well Mr. Collins has a small fenced-in nursery, where some rows of paspalum, Rhodes' Grass, African Wonder Grass occasionally receive the contents of a few buckets of water. They are all looking well, the last two-named grasses having, after two or three months' planting, runners a couple of feet long.

So pleased is Mr. Collins with his experiment that he intends planting a paddock of these grasses.

The well referred to supplies a good idea of what these sand-plains consist of at a depth. Under a cover of sand, bound more or less together by means of an admixture of clay, there is a foot or two below the surface a layer of compressed sand and clay stained with iron, apparently as hard as a pug wall. This hard pan has a thickness of two or three feet, under which, on the spot referred to, is a fine water-bearing stratum which supplies good stock water.

A continuation of the drive along a branch road, which now and then crosses a sand-plain, offers no difficulty for the motor car. The floor of the road is fairly firm. Ten miles beyond the hotel we reached Goongooning, Mr. Hamersley's run, and here we again had evidence of the capabilities of the country for growing grasses.

Around the homestead is a stretch of jam wood and sheaoak country. On the cleared patch by the house some grape vines and stone fruit trees and figs were planted a couple of years ago. Although we are in midsummer and it has not rained for two months, the top inch of the cultivated soil, when scratched with the boot, shows soil quite moist and of a much darker colour underneath.

Along the dry gully which runs by that patch Mr. Booth, the manager, has sown paspalum seeds on the unstirred hard surface, and one sees every few yards green stools of that grass solidly established amongst the indigenous growth. A flock of sheep, sometimes amounting to 1,000 head, are now and then turned into that small paddock, in which also the working horses are kept. In spite of this apparently hard treatment, the paspalum is green, and if permited to seed would soon spread, as show on

THE SAND-PLAIN,

where another interesting experiment is in course of being carried out. The site chosen is one of the most unpromising of the extensive area of the same class of country around.

It occupies portion of a height from which the sand-plain rolls for miles away encircling the salmon gum forest. An area of five acres has been fenced in, and an examination of the ground along the line of fencing shows that the subsoil has been struck at every post-hole.

That subsoil consists of some ironstone gravel embedded into an ochre-coloured hard pan of clay and sand mixed. About it the surface soil, which is 12 inches to 18 inches deep, and consists of light-coloured sand with a small admixture of clay, supports the coarse brush-like vegetation, which is the striking feature of the sand-plain country.

That land was simply ploughed with one horse and plough two years ago, and fertilised and sown with lucerne, paspalum, and rye grass.

A strip of rye grass by itself showed good growth, but is now browned; then comes the paspalum, a patch of which is sown by itself, another patch sharing the ground this season with a crop of oats and a crop of wheat.

Now that the cereals are ripe the paspalum shows amongst it green and fresh-looking. As no stock has been allowed to crop it down, last year's plants have seeded and the breeze has carried light seeds all round, where young plants are now seen growing.

The lucerne is brown and sickly where it shares the ground with a crop, and stronger where it occupies the ground undisturbed.

Stock will this year again be kept off the plot.

The conclusion drawn from the experiment is that, although artificial grasses may not prove vigorous enough to repay the cost of establishing the pastures on the Eastern Districts sand-plains, yet there are extensive patches of land met with on these areas where the ground keeps moist for a long time through the summer, and where such deep-rooted and the hardy summer grasses as paspalum, Rhodes' grass, African Wonder grass, and also it may be inferred, chickory, sheeps burnett, would grow with an amount of luxuriance that would well repay the cost of establishing them.

One fact closer acquaintance with the sand-plains referred to brings out unmistakably, is that they are by no means uniformly through the barren stretches that a casual glance at them, when looked at through the window of the car, would make them out to be. The sandy surface which prevents the water running to waste, the retentive subsoil which keeps the 12 inches of rainfall from sinking too deep out of reach of plant roots and conducts the water down the sloping plains to spots where it breaks out in to soaks, or where it can be tapped at shallow depth, offer possibilities which have not yet been utilised as it deserves.

The Eastern District sand-plains are not everywhere hopelessly arid waste lands, but in many places they appear to be extensive reservoirs hidden from view but nevertheless available for use.

THROUGH THE KIMBERLEYS.

By R. E. Weir, M.R.C.V S.

After the previous day's experience it was gratifying to find myself in camp enjoying the small comforts which are associated with that class of life, and at the same time recuperating after so long and tiresome a journey. The rest, however, was not of long duration, as the lowing of cattle and crack of the stock whips heralded the approach of the musterers at midday, and this necessitated that inspection work had immediately to be proceeded with. Cattle from all parts of the run were collected, and, after yarding, a crush inspection was made, and in some instances the animals were thrown. Yet although the united efforts of Inspector Haly and myself were tried to the utmost, our endeavours to find any trace of tick were unsuccessful, and the search was ultimately given up, being fully satisfied the station was free from the pest. Chiefly on account of its altitude and nature of the grasses this particular part of Kimberley is not conducive to successful hatching, and although it is possible some small amount of propagation may occur, its presence would not be injurious to stock On completing our work here we returned to Flora Valley, thence to Hall's Creek Midway betwixt these two places we arrived at a very fertile little garden situated in the cleft of two ranges and well watered from springs which are flowing from the base of the hills; vegetables and tropical fruits grow luxuriously, and the best of attention is being paid to it by a kindly disposed "Malay" This productive little spot was first brought into cultivation in the early digging days, when good returns were obtainable, but with the waning of that industry a gradual decline has taken place, until now a bare existence is being realised From this part to Hall's Creek the country is auriferous and devoid of much vegetation. From the roadway may be seen ample evidence of prospecting having been done, but with the exception of a few who eke out a precarious living near Hall's Creek, mining in the district may be considered at a standstill. The township of Hall's Creek is situated on the same class of country, and has little to recommend it beyond its high altitude, which provides cooler atmospheric conditions than is obtainable in the surrounding parts The principal buildings comprise a post office, which is fast falling into decay; good substantial police quarters; Jock Ingils' notable store, where our larder was replenished, and, last but not least, a pub, which is famed throughout the land for its genial landlord and the good quality of its liquors. As horse feed was here unprocurable, our stay was of short duration, so we proceeded on the same day towards Mt. Barrett, and arrived at Shepherd's yards early on the Sunday morning. Mr. Shepherd joined us the same evening, and on the following day his cattle were inspected and found to be in the same satisfactory condition as obtained at Sturt Creek. The country here is elevated and rangy in character with well-grassed flats intervening, though not conducive to the successful propagation of tick, and for this reason little fear may be entertained with regard to its spreading in this direction. The country is eminently suitable for the stocking of both cattle and horses, but the absence of any large rivers makes the water supply a matter of serious difficulty, especially during dry seasons. This will always act as a deterrant against heavy stocking, and until artesian boring has been more fully brought into vogue the full capacity of the land will not be made possible. Our course was next directed towards the Margaret River. Arriving at the "Rock Hole," we awaited the coming of the Sturt Creek manager, who had previously arranged to meet us at this spot and accompany us to the Margaret Station. Our short stay here was made very agreeable by Mr. Langley, an elderly gentleman, who owns a small sheep run in the neighbourhood, and whose homestead is practically adjacent to the rock hole, where a permanent water supply is obtainable. Unfortunately his experience in the direction of sheep husbandry has not been of a profitable nature, being chiefly due to his incapacity to personally supervise the flock and (with the exception of some choice little flats) the unsuitableness of the country for the successful propagation of this animal. The whole of East Kimberley may be classed as cattle country pure and simple, and those who confine their attention to the development of this class of animal may anticipate good returns, if not a competency, after a very few years. The only objection to the life is the climatic conditions prevailing during summer, when the humid heat, flies, and mosquitoes make living anything but of a pleasant nature. The winter conditions are, however, usually good, though there is sometimes a liability to contract malarial fever. On Mr. Atkinson's arrival preparations were made for continuing our journey, and after two days run the Margaret homestead was reached. The manager had the musterers immediately at work, and little time was lost in collecting cattle; the examination was continued for two days, and the station ultimately declared clean. This particular run, which is situated on the borders of the two Kimberleys and 80 miles from Hall's Creek, was first occupied in 1900 by Stretch & Co. as an adjunct to the Sturt Creek run, and stocked with 1,000 head of mixed cattle drawn from their head station. This number has since increased to 6,000, though the carrying capacity of the run is very much greater. A large area of the country is composed of small well-grassed flats intersected by steep rugged spinfex ridges, at the base of which are frequently to be found springs, which are invaluable, especially in dry seasons. Usually a plentiful supply of good drinking water is obtainable from the Margaret, which runs through the property, but at the time of my visit the bed of this river was perfectly dry, and careful husbanding of all spring supplies had to be made. The grasses over the run, though coarser than at the Sturt, are of a more mixed order and have better fattening qualities. For this reason it is possible that in future years the property may be used chiefly as a fattening depôt. Having at this stage decided to continue my journey to Derby, Inspector Haly very kindly offered his services to drive me there, which offer was gladly accepted, more especially as any other means of conveyance was here unobtainable. The question of route was then discussed, as a considerable saving could be made by going direct from the homestead to the Derby road; this track was, however, considered inaccessible for a conveyance, and before deciding, Inspector Haly rode over the worst portion (12 miles) and reported the route possible if I was prepared to assist in doing some hard work on portions of the track, which otherwise could not be travelled over. This was no discouragement seeing that a saving of 40 miles could be made, and early on Sunday morning, after bidding adieu to our kind hosts, we crossed the bed of the Margaret and entered on a rough and tumble journey over boulder-strewn rocks, through ravines, and over precipitous hills until arriving at another bend of the Margaret, the banks of which presented a perpendicular face of from 12 to 20 feet deep. The most accessible part was chosen for a cutting, and whilst the good folks of the metropolis were attending their devotions we were busily engaged making a pathway over which future generations may travel in safety. The work, although trying, with a temperature ranging about 100, was ultimately crowned with success, and we passed over in safety. Some few minor cuttings had afterwards to be made, but we ultimately arrived at Cox's outstation homestead thoroughly tired from our day's exertion. The next day, following the course of the Margaret over a narrow strip of fertile plain country, we arrived on the Derby road at dusk, and camped at Pond Springs. The water here was found to be mineralised and apparently had medicinal properties of a high order; for this reason it was much appreciated, especially as we had to be content with very indifferent supplies on previous occasions. From this part to the Louisa River rough broken country was met with, and the travelling was most difficult and monotonous Some parts were made interesting from the perpendicular appearance of the hills with their flat table tops—conspicuous monuments following on a changed condition of the earth's surface, resulting from a severe flood in the prehistoric ages. The whole of this area of country is little used for stocking, though here and there may be seen some stray cattle quietly browsing on well-grassed flats, which they no doubt consider as their own special property. From the Louisa River to Fossil Downs plain country is met with, both feed and water being fairly plentiful. Fossil Downs station is particularly well-grassed country; some miles of open plain, bearing a fine species of Mitchell grass, is capable of very heavy stocking, but here also the water difficulty is met with, and the full carrying capacity cannot be made available. Arriving at the Fitzroy telegraph station on the evening of the 7th, full details of the Chicago meat exposure were kindly supplied by the postmaster The impression then formed was that the report was very much exaggerated, and the official reports since coming to hand have fully borne this out. That some parts of the huge works may have been in an insanitary condition was possible, but such wholesale condemnation was not at all feasible. A pleasant drive over plain country brought us to the Fitzroy Crossing, at which place we ascertained that both feed and water were difficult to obtain over the whole course of that river. For this reason we determined to travel *viâ* the telegraph route, and reached the Oscar Range station on the same evening, where we were made very welcome by Mr. Corbett and the manager.

THE BUNBURY SHOW.

By Percy G. Wicken.

The Annual Show of the Wellington Agricultural Society was held at Bunbury during November, under most favourable conditions. The weather was all that could be desired, being both bright and cool. The show ground is situated close to the sea beach, consequently the ocean breeze blows directly across the show ground, and reduces the heat of the sun very considerably. It is stated that the first agricultural show was held in Bunbury in 1868, and if this is correct this was the 39th annual show held in the town. Last year the National Show was held in Bunbury, and attracted a large number of entries, but such is the progress made by the district that, although there was no special show this year, the entries were almost equal to those of last year, while, if anything, the exhibits in the pavilion exceeded those of the previous year. The exhibits shown in the pavilion were of excellent quality; while the two exhibits of farm products by Mr. G. C. Rose, Parkfield, and Mrs. C. E. Rose, Roelands, were better than any collection yet seen in the State.

The stock sections were as usual well filled, and the animals exhibited show an improvement every year. The breeds of cattle shown were Ayrshire and Jerseys, all of the milking strain.

The prize offered for the milking contest brought out more entries than it has done in previous years, and the competition was keen. The prize was this year given for the best two cows entered by one competitor, who produced conjointly the greatest quantity of butter fat from one milking. There were seven entries, but only five came up for the final test. The cows were taken possession of by the Society at five o'clock on the first day of the show and milked dry. They were milked again at 8·30 on the following morning, and the milk handed to the judge for testing. The tests were made in the presence of the exhibitors and as many others as liked to attend. Mr. A. Muldoon's two cows "Milkmaid" and "Dolly," both of the Ayrshire breed, obtained the first prize, and yielded 27½lbs. of milk, testing 3·5 per cent. of butter fat, and 20lbs. of milk, testing 4·4 per cent. of butter fat respectively, the two cows together making 2·03lbs. of butter from the one milking. Mr. A. D. Temple's "Lady Kirton" and "Miss Kirton," which yielded 24½lbs. of milk, testing 2·9 per cent. of butter fat, and 18½lbs., testing 3·7 per cent. butter fat respectively, and producing 1·47lbs. of butter from the one milking, took second prize, and Mr. J. F. Johnstone's "Brindle" and "Peach," which yielded 22lbs. of milk, testing 3·1 per cent. of butter fat, and 16lbs. of milk, testing 2·6 per cent. of butter fat respectively, and producing 1·39lbs. of butter from the one milking, took third place. The tests, taken all together, showed the milk to be of a somewhat low grade, and capable of improvement. Five out of ten samples of milk tested below 3·0 per cent. of butter fat, and if the owners of dairy cattle would keep books recording the performances of each cow, the cost of feeding, etc., it will, I think, be found that no cow whose milk tests under 3·0 per cent. of butter fat is worth keeping for the purpose of butter making, although when the milk can be sold for domestic purposes it may pay them, provided the milk passes the inspection of the Board of Health.

The sheep sections were well filled up, both Merinos and Long Wool sheep being represented. Mr. J. P. O. Willard and Messrs. Harvey & Haywood took most of the prizes for Shropshires, and Messrs. H. Wills & Co. and Mr. G. C. Rose for Merinos.

The exhibits of agricultural produce shown in the produce shed were very few indeed, and of inferior quality. In this respect it must be remembered that this is not a wheat and chaff producing district, very little more than farmers' own requirements being produced. The prize for wheat and barley was taken by Mr. John Gardiner, the sample of barley being a particularly good one. A little chaff, a few mangels and sheaves of hay were all that were shown. To compensate for this small display the exhibits in the vegetable and produce sections were very good, and creditable to any part of the State.

The prize for the best box of butter containing 20lbs. brought forth 13 competitors, the first prize being taken by Mrs. Rose A. Miller, 2nd Mr. S. H. Fry, 3rd Mr. John Partridge, 4th Miss Clifton, and 5th by Mr. A. F. Clifton; the judges pronounced the exhibit as a very good one.

The prize for the best three 1-lb. rolls of fresh butter brought 12 entries, the 1st prize being awarded to Mr. A. F. Clifton, 2nd to Mr. J. Partridge, and 3rd to Mrs. C. Wright.

A cup has been presented by Mr. H. Teesdale Smith for the best dairy farm in the Wellington district. This cup has to be won three times in succession, or four times in all, before it becomes the property of the winner. This competition, which is judged some time before the show, has been won this year by Mr. J. Foster Johnston for the second time in succession. Mr. Johnston's dairy farm is called "Leschenault," and is situated within one mile of the town, and Mr. Johnston milks the largest herd of cows in the district.

In the vegetable section there were a large number of first-class exhibits, sufficient to demonstrate the capabilities of the soil in the district to produce vegetables of all description. Peas, beans, lettuce, cabbage, asparagus, rhubarb, roots and herbs were well represented. In the class for pumpkins there were three entries in which half a dozen pumpkins were shown weighing up in 80lbs., and as these pumpkins had been kept since last season it speaks well for their keeping qualities. In the vegetable section honours were very evenly divided between Mr. E. Jarvis and Mr. B. F. Cross, both of whom carried off a large number of prizes. One exhibit which calls for special mention was the splendid collection of potatoes shown. The prize for the best collection was carried off by Mr. E. Jarvis, who exhibited 13 varieties, viz.:—Breeze's Prolific, Sutton's Flourball, Early Vermont, Bliss Triumph, Manhattan, Carmen, Up-to-date. Kidney, Magnum Bonum, Snowflake, Beauty of Hebron, Bruce, and Early Rose; all of these were very fine samples and perfectly clean. The second prize was taken by Messrs. Rodgers Bros., who had a collection of nine varieties. Some of the exhibits in the class for the best 14lbs. of potatoes were affected with scab. Exhibitors should be careful not to exhibit potatoes affected with disease.

Some very good fruit was shown: apples, citrus fruits, strawberries, and cherries. The bulk of the prizes were taken by the Illawarra Orchard Co., who sent down a very fine collection.

The principal exhibit, however, was for the farm trophies. Prizes of £15 and £10 were offered for the best exhibit of produce grown and made on a farm, and there were two competitors, Mr. G. C. Rose, Parkfield, and Mrs. C. E. Rose, Roelands. These exhibitors occupied one entire side of the main pavilion, and exhibited the finest collection of farm produce yet shown by an individual exhibitor in this State. The first prize was allotted to Mr. G. C. Rose, who had a large exhibit, comprising almost everything that could be produced on a farm. Among other exhibits were a large collection of pumpkins and squashes, vegetables, preserved and dried fruits, grains, ensilage, fodders and grasses, dressed poultry, mutton, beef, pork and small goods, butter, bacon, cheese, cream cheese, cream, milk, skins, hair, wool, hides, neatsfoot oil, hams, pastry, eggs, sauces, pickles, soap, candles, pine wood, jarrah shingles, millet brooms, etc., etc. The exhibits were well displayed, and reflects great credit on the grower.

Mrs. C. E. Rose also had a very fine exhibit which, if it had been shown alone, would have attracted a lot of attention; but as it was, it was outclassed by the exhibit of Mr. G. C. Rose. Mrs. C. Rose was awarded the second prize. Her exhibit comprised a good many of the articles already mentioned, but not in such variety. One interesting item was a broom made on the farm, the handle consisted of jarrah, the head of wattle, and the bristles of horse-hair. If settlers could only be induced to try to utilise all the products of the farm, the same as these exhibitors have done, they would be able to reduce their living expenses very considerably.

A good display of local wines was made, the prizes being carried off by Mr. E. M. Clarke and Mr. John Duce; while the prize for ale and stout was taken by the Beigel Brewery Company, for their Bunbury ale.

On the second day of the show a special train for the conveyance of visitors was run from Perth, and during the afternoon the ground was well filled. The show ground is becoming too small for the number of exhibits, and during the afternoon the attendance was such as to make the ground appear to be crowded. Bunbury is advancing at a rapid rate, and visitors to the show this year could not fail to notice the number of new buildings erected in the town since last show, and also that there are still a number of new buildings in course of erection. As the centre of a large agricultural, and the port of a large timber district, Bunbury must continue to become an important place, and on the opening of the completed section of the Collie to Narrogin railway another province will be added of which Bunbury will be the port.

COTTON GROWING AND GINNING.

DEMONSTRATION AT THE PERTH EXHIBITION.

By Percy G. Wicken.

Among other machinery contained in the exhibit of the Agricultural Department at the exhibition recently held by the Chamber of Manufactures in Perth was a cotton ginning machine. This was the first machine of this kind introduced into the State. As it is stated that cotton can be successfully grown in a good many places in the Northern parts of this State, the machine has been introduced by the Department for the purpose of demonstrating how the cotton has to be treated before it can be sent to market. The machine was obtained through the Manchester Cotton Growers' Association, who are doing all they can to promote the cultivation of cotton wherever it can be grown. The supply of cotton at the present time is not equal to the demand, and any increase in the supply is welcomed by those connected with the cotton industry. Numerous experiments carried out by the State farms and private individuals seem to indicate that if given proper care and cultivation cotton may be successfully grown, at any rate, to the North of Perth. Experiments carried out at Hamel have been fairly successful, but as Hamel is situated some 75 miles to the South of Perth, the season is hardly warm enough to insure the proper ripening of the cotton pod. Some very good samples have, however, been obtained, and the cotton ginned at the Exhibition was grown at the Hamel plots.

The cotton plant will grow over a variety of soils, but prefers a light friable loam, well drained, and with a clayey subsoil. Climate has more influence on its growth than soil. The plant cannot withstand any frost, and as it is a summer plant, it can only be grown where there is a summer rainfall, or where land which has been lying fallow can be made to retain sufficient moisture by incessant cultivation during the summer months to carry the crop through.

It is often stated that cotton can be successfully cultivated as far South as 40° latitude, but experiences in this and the Eastern States do not bear this out, and the experiences gained seem to indicate that the 32nd parallel is as far South as cotton can be successfully cultivated on a commercial scale.

The labour problem has been a serious one to those in Australia desirous of entering upon the cultivation of cotton, but some of the latest machinery for the picking and handling of the cotton bolls does much to get over this difficulty. The latest invention in this direction is a machine which has a number of arms, and which, when put to work in a cotton field, picks the cotton bolls from off the plant in a similar manner to the way it is gathered by those engaged in picking by hand.

For the purpose of cultivating cotton, the land should be well prepared The land should be fallowed early in the autumn, and should be scarified as early in the spring as it is possible to work the ground without tramping down. Previous to sowing the seed, the ground should be worked until a fine tilth is obtained. As soon as all danger from frost is over, the seed should be sown, say, in September or October. The object being to give the plant as long as possible to mature its pods before the autumn frosts again set in.

The seed should be planted in drills, the distance apart varying according to the variety of the plant and the condition of the soil. From 3 feet to 3 feet 6 inches is an average distance, while the plants should be 15 to 18 inches apart in the rows.

In planting the seed a small furrow should be opened about two inches deep; in this furrow the seed should be dropped by hand or by means of a cotton-planting machine. The seed should be dropped about 15 inches apart and covered with about one inch of fine soil. As the seed can be cheaply obtained, it is best to put two or three seeds at each place, and, when the plants come up, to thin them out to a single plant; if there are any misses these should be filled up with surplus plants from other places, or a small seed-bed may be made in one corner of the block from which the number of plants required may be obtained. Thinning out and transplanting should be done on a dull day if possible and when the plants are from four to six inches high.

There are many varieties of cotton, and the question as to which variety is best for any particular district is one which can only be decided after a trial of several of the most promising varieties. As far as experiments conducted at the Hamel Experimental Station indicate at present, the most promising varieties are: Shine Early Prolific, Louisiana Prolific, and the Egyptian varieties: Afiffi and Abassi; while the Caravonica tree cotton, grown by D. Thomatis, in Queensland, has given good results in that State. The Department of Agriculture has this season distributed a large quantity of seed among settlers in this State for the purpose of testing how the cotton plant will grow in different localities; while in the Geraldton district a subsidy has been granted to a settler for the purpose of having a crop of cotton cultivated. Results from this distribution of seed should shortly be coming to hand, and from the information thus obtained we shall be able to judge of the prospects of cotton-growing in this State. As the plants become established the ground between the rows should be kept constantly stirred either by means of a horse or hand hoe, and all weeds should be kept down as soon as they appear. The cotton plant requires to have full possession of the ground, and in this climate it will require all the moisture that it can obtain.

Harvesting.—As the cotton bolls become ripe they burst open and throw out a mass of white fluffy cotton. When this takes place they are fit for harvest, and the operation of picking the bolls should begin. This is the most laborious part of the work and employs a lot of labour. With the advent of the cotton-picking machinery, this part of the work on a large plantation will be very much reduced; and if the machinery does what is claimed for it, the process of harvesting the cotton will be very much simplified and cheapened. The yield of cotton varies considerably, according to locality, variety, and climate, but a fair average to expect would be from 250 to 300lbs. of cotton per acre, in addition to which there would be 600 or 700lbs. of seed, from which cotton seed oil is obtained, after which the refuse is pressed into a cake and used as feed for stock. When the cotton is picked off the plant the seed is contained among the cotton, and in this condition it is not suitable for market, but even if it could be ginned after

Court of the Department of Agriculture at the Chamber of Manufactures Exhibition 1906

Cotton Ginning Machine

being sent to market, it would not be profitable to pay freight, etc., on the extra weight of seed. The process of separating the seed from the cotton is known as ginning; and it is a machine doing this work that was shown in operation by the Department of Agriculture. The cotton is fed into the machine, and by means of screening and a roller the seed is extracted from the cotton. The seed falls into a box placed under the machine, while the cotton passes over a roller and falls into a box in front. Gins are constructed to operate both by hand power or by machinery. The one in operation at the Exhibition, although driven by a pulley for purposes of convenience, can be just as easily operated by a man turning a handle when there is no other power available The seed, when pressed, yields a large quantity of oil, which is used for many purposes, and is in many cases sold as a substitute for lucca oil; after the oil has been pressed out, the residue is made into a cake for stock feed, or can be made into a fertiliser which, although somewhat slow in action, makes a first-class fertiliser for a soil which is deficient in humus; it contains a fair amount of nitrogen. After the cotton has been ginned it is baled up in bales weighing 500lbs.; unfortunately it has been found impossible to procure sufficient cotton in the State at the present time to fill a bale If this had been procurable it was intended to have made up a bale and have forwarded same to the Agent General to have obtained a report on its value from some of the cotton buying firms in Manchester. The operation of the first cotton ginning plant in West Australia was both instructive and interesting, and marks an era in the agricultural progress of this State, and shows that now the production of wheat has reached the requirements of the State, settlers are looking round for other products which will return them a better profit. Cotton and flax growing are both worth investigating, and a thorough practical trial of these crops should be carried out on a commercial scale to demonstrate if a profit can be made out of their cultivation and preparation for market.

VEGETABLE GROWING.

By G Chitty Baker.

(*continued.*)

Cucumbers (*Cucumis sativus.*)

The cucumber is prized everywhere, very few persons indeed, do not care for it, as they are unable to digest it. This is generally owing to the reason that old and tough ones are used instead of fresh, young, and tender fruits. Cucumbers to be thoroughly appreciated must be picked early in the morning, and eaten during the same day they are picked. They should never be left until the seed commences to harden, as it is then they are more difficult to digest. If allowed to reach the stage when the seed is well shaped and hard, the best plan is to boil them, the same as a marrow, when they make a most delicious vegetable.

Cucumbers can be grown in any good garden soil that has been well and deeply worked, with a liberal dressing of good rotten stable manure thoroughly incorporated with the soil In order to get early cucumbers a good plan is to sow a few seeds early in August in egg shells placed in a shallow box with a little good soil, enough to cover the top of the shell. A hole should be made right through the bottom of the shell for drainage. The box could then be kept on a verandah having a north-easterly aspect, protected from all winds A sheet of glass or slate placed on top of the box until the seed breaks through the soil will greatly assist in bringing them on. When the second leaf is well out lift the eggshell up, and gently squeeze it in your hand, just enough pressure being used to break it. It may then be planted where it is intended to grow, and little or no check will be given to its growth. Slight protection must be provided for a few nights until the weather gets warm. Very little advantage is gained in trying to raise plants too early, that are intended to ultimately grow in the open. Where one has a forcing frame or greenhouse, cucumbers can be grown all the year round in this State with very little trouble.

Seed may be sown in the open from September to January. One of the best, if not the very best cucumber to grow for private gardens is that known as the "Lemon cucumber." It is the size and shape of an ordinary apple, and if picked while a pale green it is most delicious, and can be eaten by anyone. It is most prolific and very early. I have picked 20 off a vine eight weeks after sowing in the open, and as many as 116 during the whole time of its growth. In fact, for the last three years I have grown no other except for experimental purposes. A great source of failure in raising cucumbers successfully is the watering the surface and not the roots. A good plan is to sink a kerosene tin, that has had both ends removed, about two-thirds of its depth into the ground about eight inches from the plants, filling it every other day with water during dry weather. Once a week a little liquid manure, or 4ozs. of superphosphate, 2ozs. of sulphate of potash, and 2ozs. of sulphate of ammonia should be dissolved and added to the tin of water. Pipes or any similar article may be used, the object being to convey the water at least a foot below the surface. The top of the soil should be kept well stirred and perfectly dry Good drainage is absolutely necessary. To be dry at the root or in stagnant moisture is equally deadly to the cucumber.

Allow plants free growth until first fruit sets, then pinch off shoots at second pair of leaves above the fruit, removing stem when fruit is picked. By this means a constant supply for some months will be obtained, and the plant kept in a healthy robust condition.

LETTUCE (*Lactuca sativa*).

The lettuce as a salading plant is the best, must popular, and useful plant in the garden. In this State lettuce can be grown from January to December. Any good garden soil will grow lettuce. From January to March seed should be sown in shallow boxes in the shade, from March to August plants for transplanting may be raised in any part of the garden, and from August to the end of the year seed should only be sown in rows where the plants are to grow, as during this time they will not stand transplanting but run to seed. Lettuce will respond very readily to any care given it in cultivation and manuring. A good plan to follow in order to quicken the growth and to obtain young crisp plants is to give an occasional watering of the following:—1oz. of sulphate of ammonia, ½oz. of superphosphate, ½oz. of sulphate of potash, and 1oz. of silicate of soda to a gallon of water. In the Ranges and on the Fields the silicate of soda may be dispensed with.

At Coolgardie, Kanowna, and the Boulder there should be no difficulty in growing lettuce all the year round, the soil is admirably suited for it, and if hessian was used to shade with during the hot months many pounds could be made by growing this plant only.

MELONS, ROCK *(Cucumis melo).*

To raise rock melons profitably the ground should be well dug to a depth of 12 inches, lightly manured, and thrown up into hills six feet apart, six seeds may be sown in each hill, and when the second leaf is well formed, thin out to three plants to each hill, keep the surface well stirred, and if the ground is in good condition, no water need be applied. Seed may be sown from August until November. Very little advantage is obtained by raising seed early if the plants are to grow in the open.

MELONS, WATER *(Cucumis citrullus).*

The water melon requires a little richer soil than the rock melon, in other respects the cultivation is similar, except that the water melon requires more room, at least eight feet should be allowed between the hills.

ONIONS *(Allium cepa).*

Onion growing in some countries is an industry of very great importance, and in this State there is at the present time an opportunity for a man to obtain very substantial results from a careful study and intelligent application in the cultivation of this all important esculent. One of the best articles on onion culture was published by the United States Department of Agriculture, the contents of which are drawn upon, but so altered as to render it applicable to this State.

Though there are several kinds of onions grown in various parts of the world, there are only two classes that are seriously regarded by the best producers and the trade in Victoria, namely, the Globe and the Brown Spanish. These have possession of the markets all the year round, the one beginning to ease off as the other comes forward, thus providing an almost continuous period of supply from the various districts devoted to this class of crop. The plant will grow well in all the States of the Commonwealth, and in any district presenting the character of soil and climate it requires. It is of an impressionable nature, if one may use the term in this connection; that is, it changes its appearance in different places to such an extent that the greatest difficulty is experienced by those inexpert in regard to the product to name the variety when seen in a new district. The Brown Spanish Onion is notable for its variations in this way. It grows long or short, broad or narrow, large or small, according to soil and climate, both of which exercise a distinct influence, the latter having such an effect upon the general appearance of the onion that it takes on different forms in the same district when the seasons happen to be dissimilar to each other. Thick and thin skins are produced by variations in climate, and the character in this respect is equally affected by ingredients in the soil, whether natural or artifically applied. Thus it becomes possible to bring about changes by attention to artificial fertilisers—assuming this theory to be correct—

although there has not been, so far, any dogmatic pronouncement on scientific authority on the subject of what class of chemical produces them, and what kind thick skins.

THE SPANISH ONION.

One trouble experienced in connection with the onion-growing industry is that a fall of rain or a spell of intense heat it likely to bring about the destruction of an entire crop by the skins being rotted or roasted off by either one of these conditions of weather. In this respect, however, the Spanish variety is not in as bad a position as the Globe, as it is more hardy. This fact gives it a value that is of importance in a climate such as that of Australia, where sudden and unexpected weather changes often take place, producing not only disaster in the onion fields, but in the cereal districts as well.

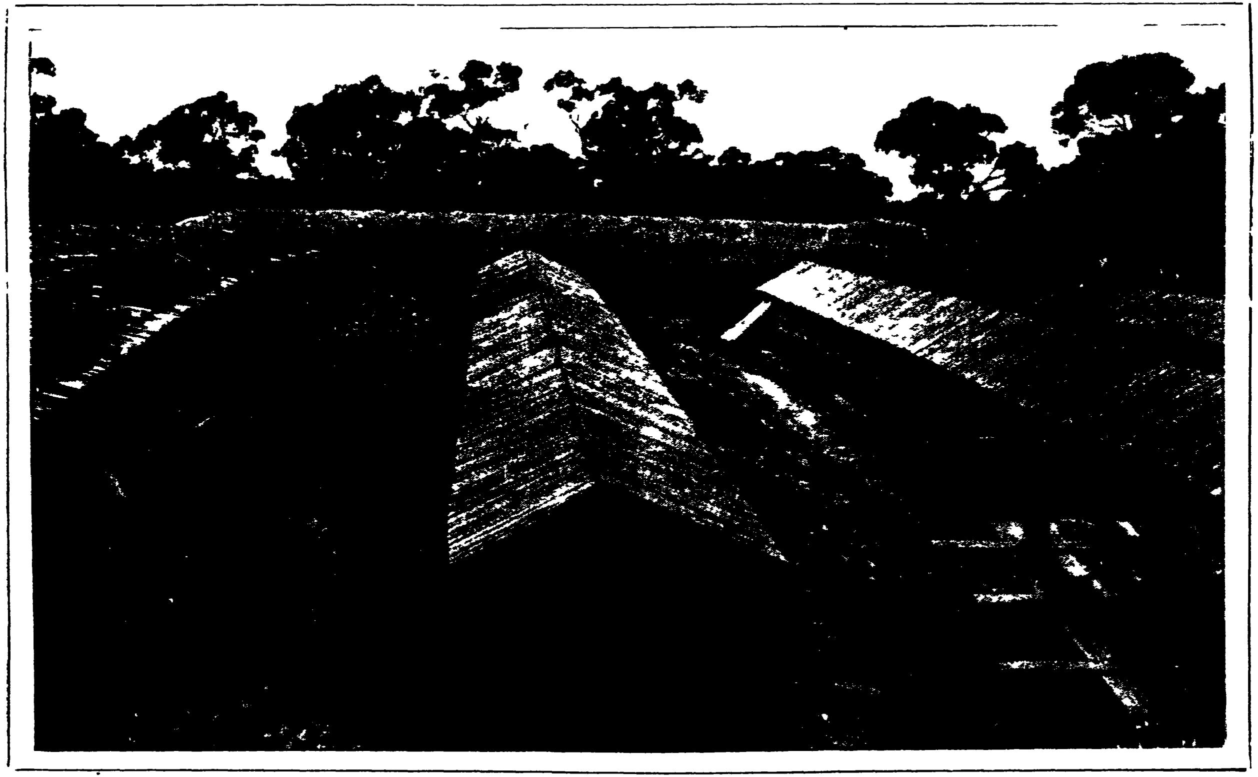
THE GLOBE ONION.

The fact that this variety comes in about December makes it peculiarly likely to be damaged during pulling time by intense heat, while the onions are on the ground awaiting removal. A shade heat at 104 to 105 degrees, or a sun heat of 160 degrees, is an intensity of temperature the crop cannot stand, and it causes no surprise to those acquainted with its susceptibility to climate influence when they hear of heavy losses in the fields at gathering time through a sudden change, either in the direction of wet or heat. The effects are very often so sudden that the most rapid removal does not save the skin from being peeled off, and in that condition the produce is unsaleable, as it will not keep, deprived as it is of its natural protection. The Victorian experience in regard to this variety is that it grows best in light sandy soil—a class of country that will not suit the other variety, its requirements being red, chocolate, or black soil, rich in character.

SELECTION OF SOIL.

A judicious selection of soil is of greatest importance. The profit or loss of the business depends largely upon whether the soil contains a combination of conditions especially conducive to the proper development of the plant, or such as will enfeeble it in every state of growth. The mechanical condition of the soil should first be considered. Heavy clay lands should be avoided, because they are difficult to plough and cultivate, usually deficient in organic matter, and often improperly drained. It is impossible to prepare them for the seed or plants as early in the spring as is desirable; and the surface bakes and cracks after the rain, unless stirred just at the proper time; besides, the plants will not bottom freely or ripen properly in heavy soils, and tend to produce scallions. Lands in which sand largely predominates should not be selected, because of their incapacity to resist drought and to retain the fertilisers applied Gravelly soils are objectionable for the same reasons. The gravel also, if very large, forms an impediment to the wheel-hoe and hand weeder. Very stony soils can never be profitably used for onions; if rich, deep friable loam can be found on the farm, it should be selected. A fair amount of sand is an advantage if the soil is sufficiently retentive to resist drought and to hold the fertilisers applied. Clayey soils, if not too tenacious, may be used with satisfactory results, provided the proper attention is given to cultivation.

Many soils which are properly drained might prove valuable for onion culture if a few lines of tile were laid to carry off the surplus water. Hilly



Onion sheds on farm in Gippsland (Vic.)

The onions are carted here after gathering, bagged for market, and stored until taken away.

Photo. by Harvey & Sutcliffe.

locations should not be selected, because of their tendency to wash, thus exposing some bulbs and burying others. Soils which have been heavily cropped for a series of years, with very light applications of manures, cannot be profitably cultivated in onions without first restoring the supply of plant food which has become exhausted. Poor soil will not produce good onions, and it requires several years to bring such soil into condition for the successful culture of this crop.

Fields which have been overrun with weeds should be cultivated in hoed crops for a series of years to destroy the weeds, which would otherwise germinate and greatly increase the cost of cultivating and weeding the onions.

The onion may, by liberal fertilising, be grown on the same ground year after year with increasing yields. Continuous culture, however, should not be followed in localities where diseases and insects are prevalent. In such cases strict rotation should be followed.

Soils which afford natural advantages for irrigation should not be overlooked. In seasons when the rainfall is not sufficient to supply necessary moisture for the growing crop, irrigation will prove highly beneficial The light soils of many creek and river bottoms, which are rich in organic matter, might be irrigated at a small cost by means of dams and ditches, or, in some cases, by pumps operated by windmills, water-wheels, or engines.

PREPARATION OF THE SOIL BY PREVIOUS CROPPING.

Soils which are stiff and heavy, which contain too much sand, which abound in pernicious weeds, or are deficient in fertility, may be greatly improved by the cultivation of one or more crops previous to planting onions. A favourite practice in some sections is to sow clover, and after the first crop is cut for hay the second growth is allowed to rot on the field, and, with a heavy dressing of stable manure, is ploughed under. The following spring the ground is planted in potatoes, and the next year onions are grown Such a course of treatment leaves the soil in excellent condition. The land is improved by the application of manure and the decomposition of the clover roots and tops, while the nitrogen supply is increased both by means of the clover, which gathers this element from the atmosphere, and by the manure. The effect of such treatment is to enrich the soil; make it loose and friable, and free it from many weed seeds. Crimson clover could be used to advantage where this legume thrives, since, when ploughed under, it produces the same effect as red clover. Cowpeas is strongly recommended to plough in as a green manure, and in many instances is even better than clover. If either cowpeas or clover is used, and followed the next year by some hoed crop which does not impoverish the soil to any considerable extent, the land is put in the best condition for raising onions. Carrots are said to be the most desirable crop to precede onions. Corn and potatoes, however, are not objectionable. Of course, more plant food should be applied than these crops remove, so that the soil will be constantly improved.

FERTILISING.

The onion requires a liberal amount of plant food in the most available form. The quantity and quality of manures which would make potatoes, cabbages, tomatoes, or many other garden crops profitable, will not give even a fair compensation in onion culture, unless favoured by soils highly fertile in their natural state. Beginners fail more frequently, perhaps from lack of appreciation of this fact than from any other cause. The most expensive item in onion culture is labour. A prominent grower estimates that it costs £25 per acre to start the seedlings, prepare the soil, transplant, cultivate, weed, and pull the crop, when the "new onion culture" is adopted. The cost of labour is just as great for a crop of 500 bushels as for 1,000. Hence it is judicious for the onion-grower to be liberal in the use of fertilisers. If the supply of fertiliser is limited it will pay better to manure one acre thoroughly than two sparingly.

Barnyard manure is indispensable in the production of superior bulbs, unless the soil naturally contains a large amount of humus (decomposed vegetable matter) Muck soils, such as are referred to on a previous page, may be properly treated with concentrated commercial fertilisers alone; but nothing can be entirely substituted for barnyard manure on other soils with as satisfactory results. Hen manure is very highly esteemed by onion growers because of its high percentage of fertilising constituents. Next to this manure, that from the pigsty is considered most valuable, although rotten barnyard manure of any kind gives good results. It is customary to deposit the manure in large piles where it can undergo fermentation, or to compost it with other materials. From 40 to 75 loads per acre should be applied if a large yield is expected. It should be spread evenly over the surface just before ploughing, a manure spreader being valuable for this purpose.

Hen manure will produce the best results when added as a top-dressing before planting. Poultry droppings should be dried and pulverised before broadcasting Specially prepared composts should also be spread after ploughing, and thoroughly mixed with the surface soil by harrowing. Care should be exercised that all the manures used are free from weed seeds.

We may learn something on the question of fertilising by studying the composition of the onion. An analysis made by the Connecticut Experiment Station of white globe onions showed that 2,000 pounds of mature bulbs contain 2·70 pounds of nitrogen, 0·92 pounds of phosphoric acid, and 2·09 pounds of potash. The average legal weight per bushel in different parts of America is about 56 pounds. A yield of 800 bushels per acre is frequently reported. A crop of this size (44,800 pounds), therefore, would remove from an acre of soil 60·48 pounds of nitrogen, 20·61 pounds of phosphoric acid, and 46·82 pounds of potash.

This shows that the onion removes the three essential fertilising constituents from the soil in large quantities, and these must be supplied to the soil if. it does not already contain them. Soils which have been freely cropped with clover, cowpeas, or other leguminous plants are not likely to be deficient in nitrogen, although light dressings of the quick-acting nitrate of soda may often be profitable on such soils. Potash and phosphoric acid, however, must usually be applied more liberally. Sometimes one and sometimes the other of the three principal fertilising constituents—nitrogen, phosphoric acid, and potash—is deficient in the soil. It is important for each grower to study the special requirements of his soil. A few experiments with concentrated fertilisers will settle many doubtful points. It is impossible to supply the needed fertilisers in the proper proportions without first acquiring a fair knowledge of he fertilising constituents already in the soil.

Of the nitrogenous commercial fertilisers, nitrate of soda is the most largely used. It contains about 15 per cent. of nitrogen. This salt is readily soluble, and exceedingly quick in its action. It should never be applied in the rainy season, because a large amount of the nitrogen would be washed out of the soil before the growing crop required it. From 200 to 400 pounds, applied in four equal dressings, is sufficient in most cases. The first application should be made just before seeding or planting, and mixed with the surface soil by harrowing. The other dressing may be given at intervals during the growing season, carefully broadcasting the salt. Ammonium sulphate, dried blood, and wool refuse, which are also nitrogenous fertilisers, are occasionally substituted for sodium nitrate, and soot is sometimes used with advantage.

To supply the potash, wood ashes are frequently employed. They have the additional advantage of improving the mechanical condition of the soil, making it loose and friable. Either leached or unleached ashes may be used with satisfactory results, the latter being more valuable on account of their larger content of potash—5 to 10 per cent. From 6 to 8 tons of unleached or 10 to 14 leached ashes is a liberal supply. Ashes should be drilled or harrowed in after ploughing. If ashes are not available, or if the expense of transportation is excessive, the grower will find potash salts, such as kainit and muriate of potash, valuable fertilisers. They are applied at the time of sowing the seed. The soil will retain the potash until the plants require it, so that the loss by drainage is exceedingly small. Kainit contains 13 to 14 per cent. of potash, and the muriate about 50 per cent. About 200 to 300 pounds per acre of the muriate, or 800 to 1,000 pounds of kainit, is a sufficient application. They should be sown broadcast after ploughing, and harrowed in or distributed by means of a fertiliser drill. A few hundred pounds of bone meal or other phosphates will be beneficial, if phosphoric acid is needed. Sulphate of potash may be used in place of either of the above, where suitable.

The manures applied are never completely taken up by the growing crop. This makes it necessary to supply more than is actually needed. In the cases of the potash and phosphoric acid, for which the soil has a strong retentive power, the excess will remain to benefit succeeding crops.

Other manures may be used with profit in certain parts of the country. Specially prepared fertilisers are largely employed by many extensive and highly successful growers.

PLOUGHING, HARROWING, AND ROLLING.

Autumn ploughing is preferable in most parts of the country; on the goldfields and in dry districts it will be found better to summer plough and leave fallow. Any manure which has been previously applied should be short enough to allow the plough to turn it entirely under the surface. The character of the soil will determine the proper depth for ploughing. If the land is rich, loose, and friable to the depth of 10 or more inches, there is little danger of ploughing too deep. It is never desirable to turn up a stiff heavy subsoil in preparing ground for onions, for this invariably diminishes the yield, renders cultivation more difficult, and requires more frequent tilling. The ground also can usually be worked sooner in the spring, which is a great desideratum in sections where it is important to sow the seed or set the bulbs at the earliest possible date.

No labour necessary to put the soil in a thoroughly fine condition should be spared. A disc harrow is almost indispensable if clods and lumps are numerous. The roller and this instrument may be used alternately with advantage. A disc harrow which contains a large number of small discs is excellent to follow one with larger discs, but the ordinary smoothing harrows will answer the purpose on many soils. After thorough harrowing a plank drag should be emloyed to level the surface and make it smooth for planting. With the many improved cultivating implements at the gardener's command, it is not necessary to use the rake on plots larger than the kitchen garden.

THE SEED.

It is impossible to secure satisfactory results without seed of superior quality. Growers sometimes make the mistake of purchasing seed of uncertain vitality because it is cheap. The cost of seed is a small item compared with the other expenditures necessary for a profitable crop, and an attempt to reduce the cost of production by purchasing inferior seed is always injudicious.

Several methods are employed to determine the vitality of onion seed. Actual planting in the hotbed or greenhouse is frequently employed. Another plan is to place a few seeds on a woollen cloth or moist cotton, and to note the number germinating.

Although these methods will answer the purpose, the most reliable results are obtained by the use of some of the devices commonly used in testing seeds, such as the Geneva tester. Of course any preliminary test can only approximate the truth. The cold, moist condition of the field may cause a much smaller percentage of germination than the test shows. Previous to purchasing, however, it is advisable to secure sample packages of the varieties desired from half a dozen or more reliable dealers and carefully test the seeds. The result will at least indicate the firm which it is safest to purchase from.

GROWING ONIONS FROM SETS.

As regards methods of propagation, onions may be divided into two classes: (1) Those produced from sets, and (2) those produced from seed. In the first class belong the button, or top, onions, which are propagated by planting the little bulbs which form on the top of the stems in place of the seeds, and the potato onions already described, which are propagated from the sets produced by the division of the parent bulb.

The first method is employed by thousands of farmers and by many market gardeners, who make a business of growing bunching onions. These sets, either red, white, or yellow, are somewhat difficult to obtain in this State, so that more need not be said on this plan

In propagating from seed, two methods are practiced: (1) Sowing the seed in the open field without transplanting, and (2) sowing the seed out of doors and transplanting to the permanent plantation the following spring, or sowing under glass in April or May, and transplanting to the field as early as the season will permit.

GROWING ONIONS FROM SEED SOWN IN THE FIELD.

The great bulk of onions produced in the United States is grown from seed sown in the open ground. If the soil is very fertile and especially well adapted to onion culture, very large yields may be secured by this method. An Ohio grower reports that he secured an average yield of over 800 bushels per acre in 1895, while some acres produced more than 1,000 bushels.

Earliness in sowing is of the greatest importance, where the bulbs should attain the largest possible size before the advent of very hot weather. The soil should be harrowed and rendered fit for sowing the first day that it is dry enough to use implements.

The seed may be sown by hand or with a garden drill. If the soil is in the proper condition, about four pounds of seed should be used to the acre, which will require 12 to 14 seeds per foot.

Drill in the seed in rows two feet three inches apart, after working the ground to a fine tilth with harrows, and roller where necessary; when implements like the Planet Junior are used, this distance can be considerably reduced, but when a horse is used, then the distance between rows must be left as stated. From 3½ to 4lbs. of seed per acre should be used at the beginning of the season, commencing in May, and tapering off to 2½lbs. per acre as the sowing time advances, finishing in August, or as late as October in exceptional seasons. The late sown crop will almost overtake the early, because the ground is in better heart when the weather is warmer, and, besides this, the seed nearly all germinates when sown late; that is why a smaller seeding will suffice.

Thinning out is done in September or October, by which time the plants may be five inches high. Weeding with a hand-worked Dutch hoe must be commenced as soon as the young plants are sufficiently well forward to allow this work to be done, and it should continue right along to the end of the year. Pulling starts about February. In a favourable season a good man can keep five acres clear of weeds.

The time for sowing mentioned above is for the South-Western and Southern Districts. On the Goldfields and North-Western Districts sowing should be made as early as possible, in order to get the crop harvested before the very hot weather sets in

TRANSPLANTING.

Transplanting consists simply in sowing the seed under glass early in the season (or in the open ground in the fall) and transferring the young plants to the field. Market gardeners have known for many years that the onion may be readily transplanted, and have taken advantage of this fact in filling vacancies. Exhibition specimens have long been grown by this method, both in England and America, and James J. H. Gregory reports having seen the plan followed in Northern Mexico in 1882, but the inference is that the seed was there sown in the open ground in the early spring and then transferred to the permanent plantation. The practice was brought to general public notice early in 1890, through an article written by T. Greiner, of Lasalle, N.Y., and published in "How the Garden Pays." W. J. Green, horticulturist, of the Ohio Agricultural Experiment Station, working independently, arrived at the same conclusions at about the same date. Both writers strongly advocated the system which they had thoroughly tested, and under the name of the new onion culture it has become generally known and extensively practised.

Experiments have demonstrated that the transplanting system has many advantages, the most important of which is, perhaps, the increase in yield. This increase is due to several causes. The plants receive a good start under glass before they are set in the field, and thus have the full advantage of the cool weather, which is most favourable to rapid growth; when sown in the field a month or more is consumed before the plants are fairly started. This is a very important consideration where the hot, dry weather may arrive very soon. Transplanting, if properly performed, always secures a full stand, which is uncertain where the seed is sown in the open ground. Pulling the plants results in more or less root pruning, and this doubtless exerts some beneficial influence on the yield.

When the transplanting method is followed, the bulbs are always uniform in size. This is a great advantage, resulting in better prices and entirely eliminating the small-sized picklers.

The seed should be sown at least six weeks previous to the date on which the soil will probably be dry enough to prepare for setting the plants. Either hotbeds or greenhouses may be employed in growing the plants. The latter is more convenient, but just as good plants may be raised in hotbeds. If a greenhouse is used, the ventilating apparatus should be so arranged that the plants can be hardened just as thoroughly as when grown in hotbeds Cold frames will answer the purpose in many parts of the South The soil for growing the plants should be rich, loose, sandy loam, entirely free from stones, etc. If necessary, run it through a sieve. One and one-fourth ounces of seed are sufficient to sow under a three by six foot sash, placing the seed in drills one inch deep and three inches apart. To secure a full stand drop about 20 seeds to every inch of row, and when the plants are well started thin them out to 10 or 12 for each inch. If 10 rows are sown, 12 plants per inch will secure 9,500 plants under each sash. It will require 174,240 plants to set one acre, making the rows 12 inches apart and allowing three inches between the bulbs It is necessary, therefore, to use 18 three by six foot sashes to raise enough plants for an acre. The soil must be kept in a moist condition while growing the young plants, but an excess of water should be avoided, otherwise the plants make a spindling growth, or perhaps "slough" off. Ventilate freely on warm, bright days. Aim to secure strong, sturdy plants at the time of transplanting. Weak, spindling plants never produce satisfactory results.

The ground having been prepared according to directions already given, the rows are marked at the desired distances, 12 inches being sufficient space if a careful workman pushes the wheel hoe. Various devices may be used in laying off the rows. If a very small plantation is to be set, the garden line will be satisfactory. For marking large plantations there is no better device than the roller marker. It consists of a simple wooden roller three or four feet long and a foot in diameter Pieces of one-fourth or one-half inch rope are nailed around the roller at the distance apart desired for the rows. Cross marks can be made at the same time by pieces of rope nailed lengthwise of the roller. These cross marks may be one foot apart. When the land is marked by this device the workman can set one plant at each cross mark and three between them, thus avoiding loss which may result from irregular planting where the rows are not checked.

Cultivating and Weeding.

Cultivation is practised for three purposes, namely: (1) To prevent the growth of weeds or to destroy those which have already appeared; (2) to form a loose surface mulch, which prevents rapid evaporation and also allows the free development of the bulb; (3) to admit plenty of air, thus promoting the chemical and other changes that prepare the plant foods for assimilation. The operation should begin as soon as possible. If the onions have been transplanted, use the wheel hoe at once to loosen the soil which has been packed by the workmen. When the seed has been drilled in, the hoe should be operated as soon as the location of the rows can be determined. The wheel roller attachment to many drills leaves a mark sufficiently plain in most soils to make the use of the wheel hoe safe before the onion plants have appeared. A few radish or turnip seeds are sometimes drilled in with the onion seeds; the plants from these make the rows very plain, and thus permit the early use of the cultivator.

The soil should be stirred frequently. Until the bulbs are well grown, cultivating can hardly be overdone. It is always desirable to stir the soil as soon as practicable after a rain to prevent the formation of a crust on the surface.

There are two classes of attachment to wheel hoes, namely, those cutting horizontally and those cutting vertically. The former are best for cultivating the plants when small, because they throw the soil away from rather than to the plants. When the bulbs begin to bottom, vertical cutting attachments may be used, being careful not to run deep enough to injure the roots. A wheel hoe, with double hoe which straddles the rows, may be used with excellent results as long as the plants are not large enough to be injured. For large plants the single hoe must be employed. The turn-plough attachment can be used to throw away the soil from the bulbs when they are bottoming.

Hand weeding is the most expensive item in growing onions from seed sown in the field. The work can be done best by careful boys They should have their knees well padded with cloth, covered with leather. They straddle the rows (on their knees), weeding with some simple tool, with which the soil containing the small weeds may be thrown away from the rows. At the second weeding the plants should be thinned out to about one to the inch.

When the transplanting system is followed only two weedings are usually required, and these may be done with long-handled hoes or other tools, the operator in a standing position. Large weeds should be removed by hand if they appear late in the season, when the onion tops form a mat and will not allow the use of wheel hoes.

IRRIGATION.

The irrigation of onion plantations has been practised for many years in places where the rainfall is not sufficient to supply the necessary amount of moisture Several eastern growers have recognised the advantage of having a supply of water in droughty seasons, and have made provisions for irrigating whenever the crop requires it. Almost every section suffers more or less from drought, and if there are natural advantages for the securing of an additional supply of water it will pay to construct the necessary dams and ditches, and perhaps to erect windmills or use engines to pump the water. If the soil is very fertile and naturally well adapted to growing onions, and the markets or shipping facilities are favourable, there will be no risk in making a considerable expenditure preparatory to irrigating.

There are three methods of applying the water, namely, by flooding, furrow irrigation, and sub-irrigation. The first method consists in planting the onions in beds which are banked on all sides to confine the water which floods them to the desired depth. A prominent grower recommends the use of beds 10 to 20 feet wide and 10 rods long. He says:—"The beds, side-wise, should be perfectly level; and it is better to have them level lengthwise as well, though they may have a slight incline. If the beds are level lengthwise the ground can be wet to any desired depth. Water may be turned on until it stands one inch in depth all over the bed—which would be equivalent to a rainfall of perhaps 1½ or 2 inches—or it may be turned on to a depth of 6 inches, according to the requirements of the case. If the bed is an incline, the lower end should be left open, allowing the water to pass off, else that end will receive a great deal more water, and the ground will probably become packed."

In furrow irrigation the onions should be planted on ground which slopes just enough to allow the water to run in the small furrows which are made between the rows. The furrows may be made by the plough attachment of the hand wheel hoe. Small furrows may be run between all the rows, or larger ones at distances of from 4 to 10 feet, depending upon the porosity of the soil. If the latter plan is followed, which is perhaps the most satisfactory, it will be necessary to omit a row where each furrow is to be made.

Large ditches and flood drains are sometimes extensively used. In this case the main ditch, which conduct the main water from a stream, is provided with a flood dam Lateral ditches of smaller sizes are run at right angles, or nearly so to the main ditch, each provided with a gate where it joins the main channel. These lateral ditches may be 20 to 40 feet apart. If the soil is loose and porous, 40 feet is not too much space to allow between them. By means of the flood gate at the stream from which the water is obtained, the current or a portion of it is turned into the main ditch. The flood gates of the lateral ditches are opened consecutively until they are filled and the entire plantation thoroughly soaked.

Sub-irrigation by means of two-inch tile has many advantages. The tiles are laid from 5 to 10 feet apart, and 10 to 12 inches under the surface. The water supply is derived from a higher level and conducted to the tiles by means of a hose or a combination of a hose and iron pipe. The water readily finds its way out of the joints of the tile, and permeates the soil in every direction. This system is especially applicable on the goldfields to small plantations.

Whatever system is adopted, care must be exercised that too much water is not applied; otherwise scallions are formed and the bulbs become spongy and succulent Cultivation should follow each irrigation just as soon as the soil is dry enough.

HARVESTING.

Onions should be promptly harvested at maturity. Harvesting should begin when most of the necks have turned yellow and are considerably withered. Although there is generally still quite a number of green tops when the main crop is ready for harvesting, the bulbs of these will thoroughly ripen if pulled along with the others. It is not safe to postpone the harvesting on account of a few green tops. If left too long in the ground the bulbs are liable to reroot, especially if there are frequent showers, and the quality of the bulbs is injured. Promptness in harvesting is not quite so important if the transplanting system is followed, as in this case the crop usually matures at a dry season.

When the onions have attained their full growth, which is usually about seven months after the seed is sown, or during the months of

Stacks of bagged onions ready for market covered with straw for protection from rain and sun

Photo by Harvey & Sutcliffe

January and February, they are harvested on the ground in rows collected in that way by wooden rakes, which follow a skim-plough especially made for that purpose and covering about three feet at each stroke, thus cutting from the ground three rows at once. They are permitted to remain in these rows for a few days, according to the weather, and are then picked up into bags and conveyed to sheds or stores, or stacked in convenient heaps about seven or eight bags in height, the stacks being about 9 or 10 feet wide, and usually covered with straw or other suitable covering. The onions must be thoroughly dry before storing.

The pulling of the crop is not an expensive operation if the bulbs are large and do not set too deep in the ground. Boys may be most economically employed in this work. The plants are simply pulled by the hand and deposited in windrows containing the onions from three or four rows. The crop is left in these windrows until fully cured, which will require from a week to ten or more days. On bright days the curing will be hastened by stirring with a wooden rake. The bulbs must be raked very gently to prevent bruising, which causes them to decay rapidly, special precautions being necessary in this respect with foreign varieties. If there is danger of a rainy season, the crop may be cured in open sheds or on a barn floor. The bulbs of white varieties must be handled with greater care than those of the red and yellow sorts If the rays of the sun are very hot the onions should be gathered in piles, each containing enough onions to make about a barrel, and then protected by thin layers of straw This will prevent the sun from turning exposed portions of the onions green After the crop is cured the bulbs are sorted, topped if desired, and properly stored.

STORING.

The storing of onions is always attended with more or less loss. If not thoroughly cured when stored many of the bulbs will sprout, and others will decay if they have sustained even slight bruises in harvesting. There will be more or less shrinkage, and a large percentage of the onions will be lost if the proper care is not given to ventilating and maintaining the desired temperature. For these and other reasons most growers prefer to dispose of the crop as soon as possible, and are willing to accept low prices rather than run the risk of loss by storage. This plan is doubtless the most judicious for those of limited experience or knowledge in the storing of onions.

It is absolutely essential for successful storing that the bulbs should be well matured, thoroughly cured, not bruised, and in a perfectly dormant state. Most growers prefer topping the onions before storing. Sheep shears can be used to advantage in this work, leaving about an inch on the onion top extending above the bulb. The sorting may also be done by hand or by means of a screen, the rods or slats of which diverge, letting the bulbs fall into three hoppers, separating the onions into three grades.

Small quantities may be stored in pits, with satisfactory results. Select a well-drained location on which to place the onions in piles. Cover them with hay to the depth of about 12 inches, then have a layer of earth, and roof the mound with boards. It is essential that the bulbs be thoroughly protected from water, which causes decay. When the cold storage process is followed the onions are stored on floors or in bins, barrels, boxes, or crates. The temperature must never quite reach the freezing point, but should not rise more than two or three degrees above it. Free ventilation is essential on bright days when the cold is not too severe and the atmosphere is dry. Cellars will sometimes answer the purpose, but they usually contain too much moisture. Barns and well constructed outbuildings are frequently frost proof, and will preserve the bulbs in perfect condition. Extensive growers, however, find it necessary to construct special buildings. An Ohio firm state that they annually cultivate about 400 acres in onions, and that a large part of the crop is cured in sheds if the weather is not dry enough to cure the bulbs in the field. The onions are then stored in the frost-proof buildings, with ventilators which may be opened at will, or closed to exclude the outside air when it is too hot or two cold. The temperature of the buildings is kept as low as possible without freezing the onions. Barrels, slatted boxes, and crates are used in storing.

Cheap shelters should be made on all farms for temporary stores as many a crop has been lost through an unexpected shower after bagging. The illustrations herewith will give a good idea of what is generally used in Victoria and could be easily erected.

SEED TESTS.

The following interesting report on the growth of seeds obtained from the Department has been forwarded by Mr. C. J. Moran, who has recently entered upon the occupation of a fine piece of country to the eastward of Wagin along the Great Southern Railway:—

I have pleasure in giving you some account of various seeds sent me by the Department for experimental purposes.

I tried them all, under the following conditions, viz.:—

We were not established here until May. The land had then to be cleared and got ready, and it was not until August that I could get the seeds out, and then it was in newly opened ground.

I tilled the soil by ploughing first, then fork digging and fertilising with bone super, and put the seeds in. The ground had no chance of sweetening by exposure.

Clover (White).—Grew, but died away on approach of summer.

Clover (Crimson).—Grew well, and is still succulent and flowering.

Sugar Beets (A and B).—Both grew, are still alive, but very small and practically worthless for stock feeding.

Lucerne.—*Ordinary.*—Came up, is still alive, very stunted and thin, and has not bunched.

Hunter River.—Grew somewhat better, but is a poor specimen compared to lucerne I have been accustomed to in Queensland.

Cocksfoot.—Grew and stooled, but has only attained a height of about 2½ or 3 inches. This grass looked and still looks the healthiest.

Hungarian Fodder.—Grew nicely to about three inches, good stem, next best to Cocksfoot; I think it will do well if it is sown earlier.

Wallaby Grass.—Is alive and making a little growth; bunched into very small tufts.

Fallow Grass.—Looked promising until very hot weather affected it.

Rib Grass.—Looked promising until very hot weather affected it.

Sheep Burnet.—Made nice growth, and if sown earlier I think would succeed.

Timothy.—Grew very thick and beautifully green, and promising during late winter and spring, but hot weather has nearly settled it.

Rhodes Grass Seed.—Every care given it, but it has not grown. Few cuttings given by the Department of Agriculture of this and Wonder grass mostly died. The exceptional frosts I think killed them. Several plants that lived through are now looking real well. I think this grass should be sown late in August or September.

Paspalum.—Small proportion of seed grew. I put some out in October, and we had a heavy shower in November. Some of it has come up and now looks splendid The seed sown in August came up, but the plants do not look so well as the later sown.

Remarks—The soils of our agricultural areas are rather cold and wet in winter but set like cement in summer. I have noticed this all over the country east of the Darling Ranges. There is a large proportion of grit and clay. I believe it pinches the grass stems and certainly it loses its surface moisture somewhat rapidly in summer. Where the soil is effectually loosened the natural grasses are much more robust.

I have noticed that the grass (local and native), especially silver grass, grew to great size and thickness of stem all along the bank of the bywash of our dam, where the surface soil was ploughed deeply and scooped up to make a byewash. It received no more moisture than anywhere else, but the difference in the grass was most remarkable.

I have also noticed the following:—Ground ploughed and well harrowed in early October and sown with sorghum and millet is still friable and the fodder is looking well, also pumpkin plants.

Some of the same ground I hand-raked and made very fine after the November shower, and strange to say it has a thin fine mulch on top, but under this it is much more solid than the same ground adjoining which was not touched after the first harrowing, and was not stirred after the later shower.

Rape will not do sown late. Planted late in August it came up and continued to make growth until the sudden hot snap early in October; it withered away then very rapidly.

Poverty Bay rye likewise; up to the warm weather it looked promising.

Rape, I have no doubt, will be a success as an early crop, and, indeed, the future of lamb raising is bound up with the question of early fodder. This applies to every part of agricultural areas of W.A.

I think, therefore, that there is nothing to-day of equal importance with this question of increasing the fodder supply of our settled areas and building up with it a steady export of frozen lamb.

I see all round this district scores of small farmers who must go to the wall if relying alone on wheat growing. When I left Wagin a week since, the best offer there for wheat was 2s. 6d. per bushel, and no warmth about the business either.

I desire to place before your Department a request to be supplied with a good mixture for permanent pasture.

I would propose two plots in first and second-class country, or rather in heavy and light soils. I would think two acres in each a reasonable test.

I would like to be supplied with a mixture by the Department, and would guarantee to sow it in strict accordance with the advice given and faithfully record the result.

I have the land cleared in both classes of ground—heavy red morrell soil and lighter jam country. I would fertilise to any extent thought advisable.

I have seen several attempts made at establishing permanent pastures but, unfortunately, in every case the plots were in open fields and stock allowed on them before they could possibly be established. I propose netting them off and allowing no stock on them for two years.

CURING MEAT.

A famous and excellent recipe for curing meat appeared in one of our exchanges, and is as follows:—To one gallon of water add one and one-half pounds of salt, one-half pound of sugar, one-half ounce of potash. This gives the ratio; in it the pickle can be increased to any quantity desired.

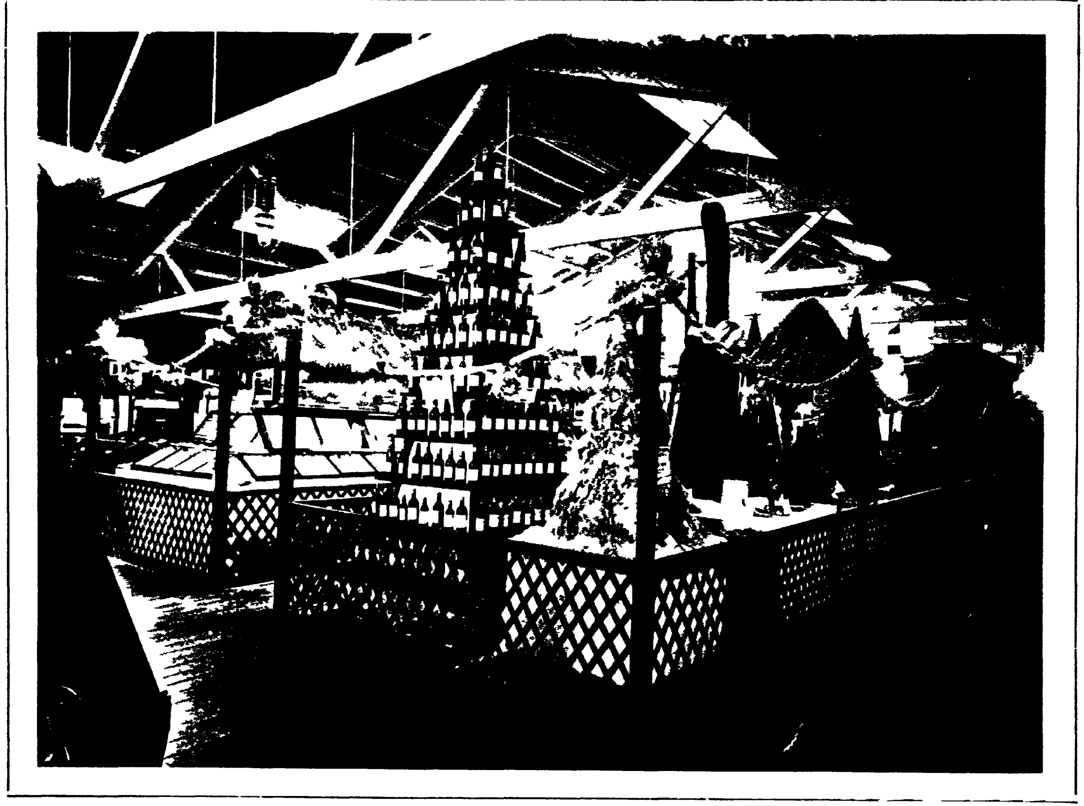
The ingredients named are to be boiled together until the dirt rises to top and is skimmed off. Then turn into a vessel what has thus been prepared and let it cool. When cold pour it over the beef or pork.

The meat must be well covered with the pickle, and should not be put down for at least two days after killing, during which time it ought to be lightly sprinkled with saltpetre; this removes all the surface blood, leaving the meat fresh and clean.

The boiling of the pickle is sometimes omitted, but it should be remembered that the boiling is a purifying process, throwing off the dirt always found in salt and sugar.

This recipe has only to be tried to prove its superiority over the common way of curing meat. The meat cured by this process is unsurpassed for sweetness, delicacy of flavour, and freshness of colour.

Court of the Department of Agriculture at the Chamber of Manufactures Exhibition, 1906



General view of Court

TESTING WEST AUSTRALIAN WHEATS FOR MILLING PURPOSES.

In April of last year samples of wheat grown at the Experimental Farms at Chapman and Narrogin, together with samples grown by Messrs. F. and C. Piesse, at Katanning, and a F.A.Q. from the Chamber of Commerce, were forwarded to Mr. F. B. Guthrie, Analytical Chemist of the Departments of Mines and Agriculture, New South Wales, for the purpose of testing their milling values and comparison. The reports which have just been received are as follows:—

Variety of grain: **F.A.Q.**; standard weight, 61·5.
Appearance of grain: Dull white, small, soft, fairly plump.
Weight per bushel (lb. per bushel): Our weighing, 60·25.
Ease of milling: Fair to mill.

Percentage of mill products	Flour, 76·5. Pollard, 10·9. Bran, 12·6.
Nature of flour	Colour of flour, excellent, rather white. Strength of flour (in quarts per sack of 200lb.), 50·0. Percentage of dry gluten, 7·2. Percentage of wet gluten, 19·1.

NOTES.

Bran very clean, small. Pollard very clean. Breakflour, 41·1 per cent. Semolina white and soft. Character of wet gluten, yellowish and non-coherent.

A first-rate milling wheat of attractive appearance, yielding freely an abundance of flour. The flour is of first-rate colour and medium strength, but is deficient in gluten.

Variety of grain: **Sydney Purple Straw.**
Appearance of grain: Dull white, small, soft, slightly pinched.
Weight per bushel (lb. per bushel): 60·25.
Ease of milling: Fair to mill.

Percentage of mill products	Flour: 71·6. Pollard, 10·5. Bran, 17·9.
Nature of flour	Colour of flour, very good. Strength of flour, (in quarts per sack of 200lb.), 48·5. Percentage of dry gluten, 6·7. „ wet gluten, 18·4.

NOTES.

Bran fairly clean, medium size. Pollard clean. Breakflour, 39·8 per cent. Semolina, white and soft. Character of wet gluten, yellowish and non-coherent.

A weak flour wheat, very deficient in gluten and not of first-class colour. The grain was slightly pinched, and consequently the sample may not be typical of its milling quality.

Variety of grain: **Comeback.**
Appearance of grain: Translucent, small, round, hard, plump.
Weight per bushel (lb. per bushel): 63·5.
Ease of milling: Fair to mill.

Percentage of mill products
- Flour, 76·1.
- Pollard, 9·6.
- Bran, 14·3.

Nature of flour
- Colour of flour, excellent.
- Strength of flour (in quarts per sack of 200lb.), 56·2.
- Percentage of dry gluten, 9·7.
- „ wet gluten, 27·1.

Notes.

Bran clean, small. Pollard very clean. Breakflour, 25·2 per cent. Semolina faint yellow, and gritty. Character of wet gluten, yellowish and non-coherent.

A heavy and nice looking grain, yielding flour very freely and abundantly. A strong flour wheat yielding flour of first rate colour, fair gluten content, and very strong.

Variety of grain: **Jonathan.**
Appearance of grain: Translucent, small, round, hard, plump.
Weight per bushel (lb. per bushel): 61·25.
Ease of milling: Fair to mill.

Percentage of mill products
- Flour, 76·3.
- Pollard, 10·4
- Bran, 13·3

Nature of flour
- Colour of flour, excellent.
- Strength of flour (in quarts per sack of 200lb.), 55·0
- Percentage of dry gluten, 10·4.
- „ wet gluten, 28·6.

Notes.

Bran very clean, small. Pollard very clean. Breakflour, 19·1 per cent. Semolina yellow and gritty. Character of wet gluten—slight yellow, elastic and slightly coherent.

A free milling wheat, yielding very abundant flour. Flour of first rate colour, high strength, and medium gluten content. This wheat and Comeback and Marshall's Red Straw are the best milling samples of the batch.

Variety of grain: **Bobs.**
Appearance of grain: Translucent, small, hard, round, plump.
Weight per bushel (lb. per bushel): 62·0.
Ease of milling: Fair to mill.

Percentage of mill products
- Flour, 75·2.
- Pollard, 12·3.
- Bran, 12·7.

Nature of flour
- Colour of flour, excellent.
- Strength of flour (in quarts per sack of 200lb.), 52·0.
- Percentage of dry gluten, 8·6.
- „ wet gluten, 22·7.

Notes.

Bran very clean, medium size. Pollard very clean. Breakflour, 36·6 per cent. Semolina yellowish and gritty. Character of wet gluten, yellowish and non-coherent.

Also a freely milling wheat, yielding high proportion of flour of fair strength and first rate colour. The gluten content, however, is rather low.

Variety of grain: **Power's Fife.**
Appearance of grain: Dull red, small, pinched, hard.
Weight per bushel (lb. per bushel): 60.
Ease of milling: Fair to mill.

Percentage of mill products
- Flour, 70·4.
- Pollard, 12·0.
- Bran, 17·6.

Nature of flour
Colour of flour excellent.
Strength of flour (in quarts per sack of 200lb.), 48·5.
Percentage of dry gluten, 9·3.
Percentage of wet gluten, 29·3.

NOTES.

Bran fairly clean, small. Pollard clean. Breakflour, 30 per cent. Semolina slight, yellow, and gritty. Character of wet gluten, yellowish, elastic, and coherent.

Grain is pinched and therefore figures may not be typical. Flour is of first-rate colour and fair gluten content, but has lost the strong flour characteristics of Fife wheats and has become a weak flour wheat.

Variety of grain: **Marshall's Red Straw.**
Appearance of grain: Dull white, fair size, soft, plump.
Weight per bushel (lb. per bushel), 63·75.
Ease of milling: Fair to mill.
Percentage of mill products
Flower, 72·5.
Pollard, 11·0.
Bran, 16·5.
Nature of flour
Colour of flour, excellent.
Strength of flour (in quarts per sack of 200lb.), 52·0
Percentage of dry gluten, 10·6.

NOTES.

Bran fairly clean, medium size. Pollard clean. Breakflour 32·8 per cent. Semolina white and soft. Character of wet gluten, yellowish, elastic, and fairly coherent.

An excellent milling wheat of attractive appearance and good bushel weight. Flour obtained readily of first-rate colour, high strength, and of good gluten content. As good as Jonathan or Comeback.

Variety of grain: **Marshall's No. 3.**
Appearance of grain: Dull white, fairly plump, medium size and hardness.
Weight per bushel (lb. per bushel): 60·5.
Ease of milling: Fair to mill.
Percentage of mill products
Flour, 73·7.
Pollard, 9·8.
Bran, 16·5.
Nature of flour
Colour of flour, excellent.
Strength of flour (in quarts per sack of 200lbs.), 49·6.
Percentage of dry gluten, 4·6.
„ wet gluten, 14·2.

NOTES.

Bran fairly clean, medium size. Pollard clean. Breakflour, 32·8 per cent. Semolina white and slightly gritty. Character of wet gluten, yellowish and decidedly non-coherent.

The flour from this sample is remarkably deficient in gluten. It is otherwise a fairly good milling wheat.

Variety of grain: **Dart's Imperial.**
Appearance of grain: Dull white, medium size, fairly plump, soft.
Weight per bushel (lb. per bushel): 62·5.
Ease of milling: Fair to mill.
Percentage of mill products
Flour, 70·4.
Pollard, 16·4.
Bran, 13·2.

Nature of flour	Colour of flour, excellent. Strength of flour (in quarts per sack of 200lbs.), 49·5. Percentage of dry gluten, 9·7. " wet gluten, 39·0.

Notes.

Bran fairly clean, medium size. Pollard fairly clean. Breakflour 37·8 per cent. Semolina white and soft. Character of wet gluten, yellowish, coherent, and elastic.

A good milling wheat of good appearance and bushel weight. Flour of first rate colour and appearance, medium strength, and medium gluten content.

VACUUM APHISTINE.

By Geo. W. Wickens.

I beg to report that in accordance with your instructions I have used the above oil as a summer spray on peach, plum, pear, and apple trees, the peach and plum trees being kindly placed at my disposal by Mr. R. C. Williams, Bridgetown, and the apple and pear trees by Mr. F. E. S. Willmott, Bridgetown.

The pamphlet giving directions for mixing and proportion of oil to water was supplied to me with the aphistine by the Vacuum Oil Co. These directions state that "ten per cent. solution vaccum aphistine (one gallon aphistine to ten of water) will prove thoroughly effective for spring, summer, or autumn dressing." This proportion of aphistine to water seemed to me rather high for tender foliage, so instead of one to ten I used one to fifteen on the apple and pear trees, and one to sixteen on peach and plum trees. The peach and plum trees were sprayed on a cool cloudy day, 15th November, 1906, and the apple and pear trees late in the evening of a warm sunny day 23rd November, 1906.

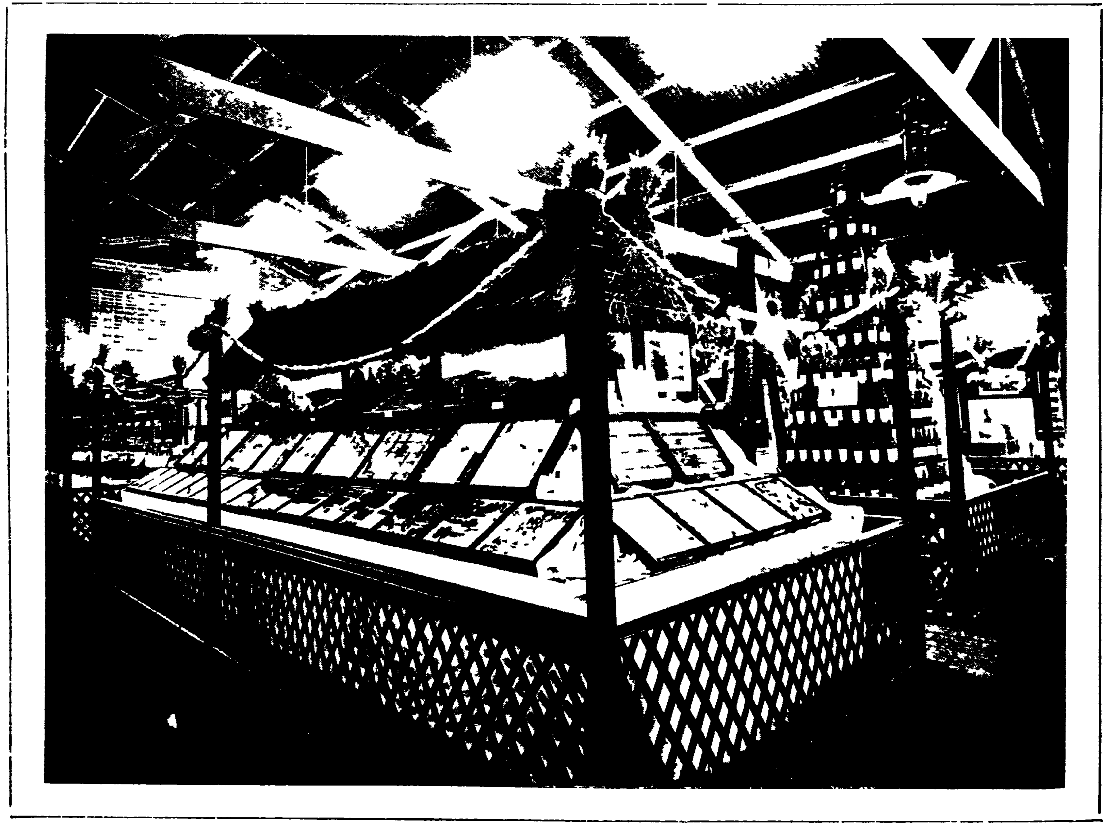
Peach and plum trees were injected with peach aphis, apple trees with woolly aphis and red mite, pear trees with pear mite.

I found in mixing the spray that vacuum aphistine (unlike vacuum oil) makes a perfect emulsion with soap and water and will not separate after being thoroughly mixed, the method of preparation being exactly the same as for kerosene emulsion, which it strongly resembles.

I revisited the trees occasionally to note results, found that all pests were killed, and for the first few days no injury was noticeable to the trees. After a week had elapsed, however, the peach trees commenced to shed their leaves, and in a fortnight from the date of spraying three young trees were completely bare of foliage, and one older tree partially. At the present time, 11th December, 1906, the trees are shooting into leaf again, except at the tips, where the young tender growths have died back.

I was particularly careful in making the emulsion to measure the quantities, and apply the spray well, and have no hesitation in saying that an emulsion made up of $\frac{1}{4}$lb. soap, one gallon aphistine, and 16 gallons water is too severe a spray for peach trees in the early part of the season when the growth is young and tender.

COURT OF THE DEPARTMENT OF AGRICULTURE AT THE CHAMBER OF MANUFACTURES EXHIBITION 1900



Plum trees lost a few leaves, but were not appreciably damaged.

Apple trees are freed from aphis and red mite, and no damage whatever has resulted to the trees.

One young pear tree has lost a few leaves, and the growth has been slightly checked, but remainder of sprayed pear trees show no ill effects from the treatment.

I may mention that as the principal reason for the above tests was to ascertain the effect of the emulsion on foliage, I drenched the trees thorougly, using more spray per tree than would be used in the ordinary course There is no doubt whatever of the efficacy of aphistine as a destroyer of insect life, but as a spring spray for peach trees the proportion of one to ten given in the Company's pamphlet would be disastrous.

VACUUM OIL EMULSION.

By Geo. W Wickens.

As the results of winter spraying with vacuum oil, both in its effect on fruit trees and pests, are now plainly to be seen, I am sending you a few notes on the above spray, which was largely used in this district during the winter months of 1906

The most noticeable feature is the in-and-out results obtained by different growers in the effect the oil has on fruit trees In some instances no damage whatever has resulted, while in other cases the same proportion of oil to water has been responsible for the death of quite a number of trees

Of course the first thing one naturally thinks is, the emulsion was not kept sufficiently agitated and the trees which have succumbed received more than their due share of oil, while others were sprayed with water only. But though this may explain the circumstances in a few cases, I know positively that it is not the cause with the majority of growers who have used this spray.

When the emulsion is badly mixed or insufficiently stirred while spraying, the first trees sprayed will receive water only from the bottom of the barrel, the oil remaining on the top. When all the water is pumped out from underneath the oil, the trees then receive a dressing of almost pure oil.

The most casual inspection will tell if spraying has been carried out in this way, for trees sprayed with water will have the same appearance as if they were not sprayed at all, while those sprayed with oil only will remain saturated with it for weeks afterwards; but if the oil has been thoroughly mixed and the spray properly applied all trees will have a uniformly dark brown, slightly glossy nppearance; and with very few exceptions this was the manner in which vacuum oil was used throughout the district.

Varying proportions of oil to water were tried, ranging from 1gal. oil, 1lb. soft soap, 9gals. water to 1—1—15, the most common being 1gal. oil, 1lb. soft soap, 10gals. water for pip fruits, and 1—1—15 for stone fruits.

The results show there are four varieties of apple trees constitutionally much weaker than others in their ability to stand strong sprays, and these are: Northern Spy, Five Crown, Nickajack, and Cox's Orange Pippin; Northern Spy being a good first, for it not only dies at the top, where the wood is young and tender, but perishes root, stump, and branch.

All the other well-known varieties are unhurt and carrying good crops of fruit, but the four sorts mentioned above, even where they are not actually dead, are in a very bad way with dead and dying limbs.

Thus a peculiar fact has been demonstrated—a spray can be strong enough to kill some varieties of apple trees right out which when applied to other sorts does not even damage their fruit buds.

As far as I am aware, no pear trees have been injured.

Where stone fruits were sprayed with 1gal. oil, 1lb. soft soap, 15gals. water, some peach and apricot trees suffered slightly, a few limbs being killed, but no trees died right out, and excepting where the limbs were injured, the trees blossomed and set their fruit.

Where 1—1—10 was used on stone fruits, peach and apricot trees met with sudden death.

With reference to the effect of the emulsion on pests, I may state that it is the most effective spray I have seen used.

Anyone who is familiar with the orchards in the South-West knows what the trees are like from the attacks of red mite, particularly apple trees.

I know one orchard of 10 acres, owned by Mr. F. Willmott, Bridgetown, where in the months of March and April last it was almost impossible to find one green apple leaf, the whole place wearing the appearance of having been caught in a storm of reddish-brown dust; and this was after it had received a heavy winter spraying with lime, sulphur, and salt, and innumerable summer dustings with sulphur.

Mr. Willmott is one of the most successful of those who used vacuum oil last winter. At the present time, it is a difficult matter to find a single red mite in the whole of the ten acres of fruit trees, the pest for the time being practically annihilated, and this result has, fortunately, been achieved without any damage to the trees, this being one of the very few places where Five Crowns were sprayed 1-1-10 without being harmed.

Of course, where the pest is so universal, it is bound to find its way on to the trees again, but the present benefit is unmistakable.

The effect of the oil is not, as many people think, to remain on the tree and by so doing kill the red mite when it emerges from the egg and commences to feed, but the egg itself dries up. This does not happen for some weeks after the spray has been applied, the eggs maintaining a bright, healthy appearance until the trees have burst in leaf. As the summer advances, they slowly dry up and fall off.

The oil is equally as effective with San José scale, woolly aphis, and pear mite.

The general opinion of growers who have used vacuum oil is very favourable in spite of the fact that most of them lost a few trees, and they talk of continuing its use as a winter spray, for it is an undoubted fact that any trees not injured have benefited materially, being freed from pests and making luxuriant growth.

My own impression is that on account of the tendency the oil and water have to separate no matter how well they are mixed, and the constant agitating necessary to keep the oil from rising, the spray will always be dangerous for any but the most careful to use. Also that one gallon of oil, 1lb. soft soap, 16 gallons water for pip fruits, and 20 gallons water for stone fruits will be found sufficient.

Also that as the oil remains on the trees for a long time after spraying it would not be judicious to make it an annual spray unless in greatly weakened quantities.

Also the barrel should never be pumped out to the last drop, as the last half gallon in a big spray barrel will always contain a high percentage of oil.

In conclusion, I would like to mention that the vacuum oil spray has not been used only where San Josè Scale exists in the orchards and the Department has advised its use, but many have tried it on their own initiative for the purpose of keeping in check red mite and woolly aphis.

GUM BARK FOR SPRAYING.

By T. Hooper.

On August 29th, at Kelmscott, in Mr. G. K. Martin's orchard, I examined two apple trees infested with the San José scale. These trees Mr. Martin had experimented on by spraying with a decoction made from green Wandoo bark (white gum. *Eucalyptus redunca* Schauer). The wash was made as follows:—4lbs. of pounded green bark, boiled for four hours, and water added up to six gallons I found most of the scale dead, but as there was nothing to show that the trees had been sprayed I could not say whether the few scale found alive remained through not being sprayed, or the wash not being strong enough. I recommended Mr. Martin to spray again and add a little lime, about ½lb., to 10 gallons. On the 4th December I again visited this orchard and found Mr. Martin had sprayed again with Wandoo bark decoction, using 2½lbs. of bark to one gallon of water, and a very little lime. I could see no traces of the lime to indicate the wash had been applied, so the object of the lime to show what portion of the tree had been sprayed had failed, but on the other hand I could not see any live scale. It would be interesting next winter to make experiments with this wash to determine at what strength it will kill the scale without injuring the trees. In this case the trees were not hurt, but an experiment on two trees is not sufficient to be able to give reliable data.

Experiments to test the value of the decoction as a summer spray are now being carried out.

NANGEENAN EXPERIMENTAL FARM.

One of the most interesting reports yet received has been that of Mr. Jno. Robinson, the manager of the Experimental Farm at Nangeenan. Interesting it is by reason of a most satisfactory result from crops grown in a district that received under nine inches of rain for the twelve months, showing as it does in a most emphatic manner what can be down in the drier portions of our vast territory. Mr. Robinson has followed the principle of summer ploughing and the continual working of the soil during the dry months, or in other words following the system of dry farming, in an intelligent manner. We have frequently advocated the cultivation of crops on these lines, in the pages of the *Journal*, therefore welcome any practical results that have been obtained through the following of this system.

Samples of wheat referred to in the report may be seen in the Minister's office, Department of Lands. The report is as follows:—

Report on the crops harvested at the Nangeenan Experimental Farm for the season 1906.

Hay.—An area of 156 acres was cut for hay, giving an average of 11cwt. per acre. This has been placed into two stacks containing a total of from 120 to 130 tons. It is all in good green condition.

Grain.—The quantity and sorts of wheat harvested and specially cleaned for seed purposes (samples of which are herewith submitted) are as follows:—

Alpha.—A new wheat hybridised by Mr. G. Berthoud at the State farm Hamel, for dry areas. Sown on the 19th April, at the rate of one bushel to the acre; harvested on the 10th December. Yield averaged nine bushels to the acre. Splendid seed was obtained from this wheat.

Barrota Wonder.—Sown 19th April; harvested 18th December; average yield 14 bushels to the acre.

Yaodillah King.—Sown 20th April; harvested 15th December; average yield 18 bushels to the acre.

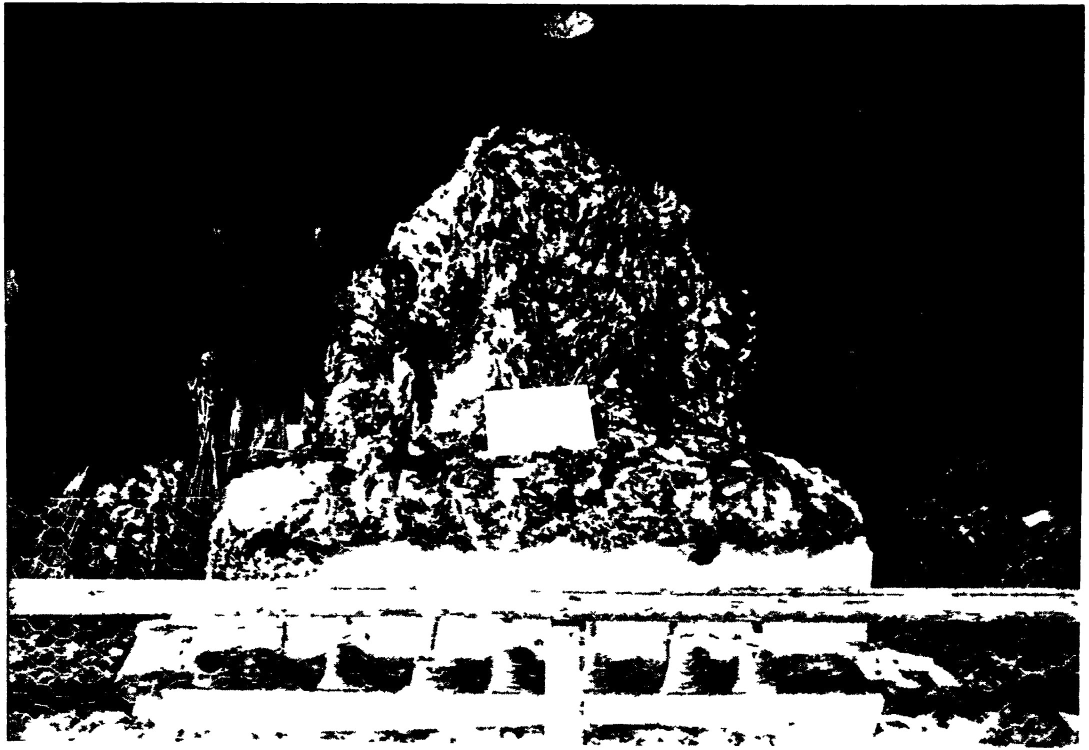
Gallant.—Sown 19th April; harvested 10th December; average yield 9 bushels to the acre.

Renaf.—Sown 19th April; harvested 11th December; average yield 8 bushels to the acre.

Manure.—All plots received the same amount of fertiliser, viz., 75lbs. of superphosphate to the acre.

Mr. Robinson adds:—The yields all round must be considered satisfactory, bearing in mind the fact that the rainfall from the time the crops were put in till harvesting totalled only 8·50in. These wheats have been specially cleaned, and will be made available for sale, with the exception of a sufficient quantity for next season's sowing at the farm.

Court of the Department of Agriculture at the Chamber of Manufactures Exhibition 1906



Collection of Produce from State Farm Narrogin

NARROGIN STATE FARM.

REPORT FOR THE MONTH OF DECEMBER.

By R. G. Baird.

Since my last report harvesting operations have been in full swing. Haycutting was completed early in the month, and the oat crop was then cut for threshing.

Portion of the hay crop has been carted to the old homestead and put in the hay loft for chaffing; the balance will be stacked at the new site so that it will be at hand when the stabling, etc., are removed there.

The weather during the month has not been favourable for harvesting, being often showery and cold.

The orchard and vineyard are in a good state of cultivation, and the trees and vines have made good growth. There has been a good setting of grapes, but the cold snaps in the weather retard their development. The vegetable garden has given good results and we have had sufficient for all requirements. This branch of the farm could be enlarged with even better results.

Late onions planted out on a moist patch have done remarkably well; also tomatoes and pumpkins, some of the latter measuring two feet in diameter.

The hop plants have made good growth, having sent out runners eight to ten feet in length.

The sheep are in excellent condition. All the lambs have been removed from the ewes and the rams put with the latter.

The cattle are in very good condition, although owing to the drying off of the grasses the milk yield has fallen away.

The horses are in good working condition. The mares with foals at foot have now to be fed, twice a day. We will, however, be able shortly to turn them into the stubble fields, where they will do well for a time without extra feeding. During the month three foals were dropped—two pure Suffolks and one ordinary sort—thus making six foals for the season.

The pigs have done very well, and we are able now to change the daily ration of mutton to pork occasionally. There are a number of pure young Berkshire boars and sows for sale; also several very good young middle white Yorkshire boars.

CHAPMAN STATE FARM.

REPORT FOR THE MONTH OF DECEMBER.

By J. KEAYS.

The principal work during the month was cutting of cereal crops for grain. This work was done with student labour.

The cotton plots Abassi and Ashminon are making slow growth owing no doubt to the dry weather prevailing since they were planted, August 18th. The total rainfall since then is 240 points. In cotton growing countries about three to four inches of rain per month is considered only a fair amount of moisture to grow an average crop. However, the plants are sturdy and healthy and may yet do well. The correct time to plant in this district is only in the experimental stage, but from tests made this season there is very great danger of the young plants being nipped by frost if sown earlier than August.

During the month a six-acre plot of amber cane was fed off, the height varying from one foot to four. A small paddock of pearl millet is also being fed off. Maize has not done well owing to want of sufficient moisture. The amber cane is hardier and is doing fairly.

The imported English Dexter cow, "Dahlia," has dropped a sturdy bull calf by "Jolly Jim," recently imported from Kerry, Ireland.

We have sold all the 2-tooth Shropshire rams. Shropshires are deservedly popular with breeders for raising a good type of lamb for freezing.

The rainfall for 1906 is 15 inches.

CORRESPONDENCE.

MALE BLOSSOMS ON PUMPKINS.

The following letter, addressed to Mr. G. Chitty Baker, has been received from Mr. Chas. Nawell, of Kanowna:—

"Just a line to thank you for your expert advice *re* my tomatoes during your recent visit to Kanowna. You advice *re* pinching shoots I duly carried out; also erecting V-shaped trellises, which I find has well repaid me for the trouble. I transplanted in October, and have had tomatoes in December. I am now getting 8d. per pound, while the coastal are selling at 4d. They are growing vigorously and are greatly admired by everyone visiting the place. Several people had tomatoes in, but the grubs and cut worms played havoc with them; but my spraying and laying of poison effectively kept the grubs and disease at bay. You will no doubt remember my pumpkins and melons growing among the branches. They are growing well, but the pumpkins are all male flowers. I should like to know if there is any remedy for that; it might be something in the soil that is required; but anyhow I only have three or four in, and it does not matter much. *Re* tomatoes, it is my intention to raise them much more largely the next season; and at any time when you or any other representative should be visiting the fields I should deem it a favour if you would give me a call, as there is a great deal I should like to ask you."

With reference to the pumpkins, Mr. Baker states that:—"The reason of so many male blossoms being seen on the pumpkins is that the seed was evidently very new; it is a good plan when sowing pumpkins, melons, or cucumbers to sow a few seed two or three years old with the new or first seed. The older the seed the fewer male blossoms, or, rather, the female blossoms are much earlier to show, although the gross bearing is not any better, but only earlier."

HORSES AND CATTLE ON LIME COUNTRY.

A correspondent at Fitzroy River writes:—"Would you kindly advise me if there is any practicable method of dealing with the ill effects of too much lime in the soil on which sheep and cattle are running. I have been told that difficulties arise through the presence of lime in the water forming a ball inside the animal. Could anything be done to prevent this solidifying. I have also been informed that horses bred in this kind of country suffer from contracted heels, and would like to know if it is caused through the lime or sand."

The matter being referred to the Government Veterinary Surgeon, Mr. Weir replies:—"That the only practical method in dealing with stock which are running on country in which an excess of lime exists is to remove them at intervals on to other country having a deficiency of this particular mineral soil constituent. As a remedy: 1oz. of vinegar or half a pint of raw linseed oil given daily to horses or cattle until a recovery takes place. Olive oil or milk may also be used to advantage. With regard to contracted heels, this is more likely to arise from running on sandy soil, as the lime usually results in the development of good bone and fat.

BEETROOT FORKING.

A correspondent writes asking the cause of the forking or sending out of many roots. The cause of this is the application of fresh manures or badly prepared ground. To grow carrots, beetroot, or parsnips to perfection they should follow a crop that had been well manured; dig the ground thoroughly to a depth of 12 or 18 inches, sowing the seed very lightly, thinning out to eight inches to a foot. One of the very best beetroot to grow for small gardens is the "Globe" or turnip-rooted beet. In gardens where the subsoil is at all retentive it is very difficult to get symmetrically formed roots unless a shape is first used to form a hole in the ground, which is afterwards filled with fine earth. This is a troublesome job, and the use of the turnip-rooted variety dispenses with all extra work.

NON-FRUITING OF PUMPKINS AND DISEASE IN POTATOES.

A correspondent at Northam writes:—

1. Can you inform me what is the reason pumpkins will not grow to a success here. The soil is a good strong sandy loam, in jam country, with plenty of moisture. I used superphosphate by itself, also stable manure. The runners of the vines grow well and form plenty of fruit which grow to various sizes and then drop off; other fruit is practically dead before the blossom opens

2. Potatoes grown from good seed on same ground producing a fair crop looking quite sound, are full of black spots when cut open, some of the crop left in the ground produced a self-sown crop of sound healthy tubers.

The matter being referred to Mr. G. Chitty Baker, he replied as follows:—

1. In the absence of specimens of the pumpkins it is difficult to say for certain what the disease really is, but from the description given it is likely to be a fungus, the treatment for which should be a good spraying with Bordeaux or Burgundy mixture (summer strength). Two or three applications at an interval of a week—if done at the early stages of the growth of the plants—would produce beneficial results. Dusting with sulphur in some cases is also very good.

2. The description given of the potatoes also indicates a fungus. Spraying with Bordeaux or Burgundy mixture (winter strength) is the best preventive. The potatoes left in the ground giving a good crop is explained by the fact that they grew at a different time of the year, when conditions were not favourable for the growth of the fungoid spores.

I am inclined to think that the ground requires drainage. Deep cultivation during the summer would allow the heat of the sun to penetrate as far as possible and thus assist in purifying the ground.

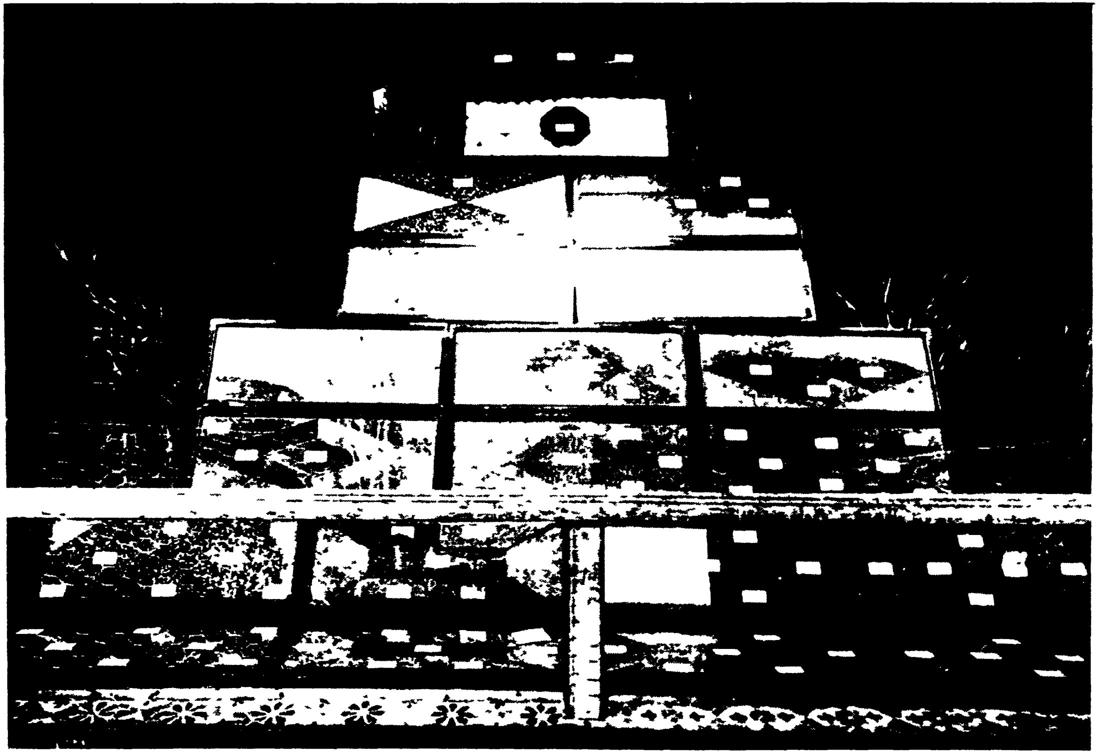
In any case, the early application of either of the two mixtures mentioned will be found of great value.

RAILWAY FREIGHTS REDUCED.

ON GRAIN FOR MILLING AND EXPORT.

The new rates for the carriage on the railways of grain for milling and export were announced by the Minister for Railways on the 22nd inst. A reference to the schedule given below will show that a considerable reduction has been made on the old charges. Not only is wheat for gristing carried on the lines at a specially low rate, but on wheat for export a further rebate is allowed of 12½ per cent. An instance may be given of how the new charges will operate. Should a farmer, say at Beverley, send wheat to be gristed at Northam, he would be charged for the 43 miles 6s. 10d. per ton. Then if the flour and by-products of the grain were shipped to Kalgoorlie the carriage for that product would be from Northam to the goldfields £1 0s. 4d. per

COURT OF THE DEPARTMENT OF AGRICULTURE AT THE CHAMBER OF MANUFACTURERS' EXHIBITION, 1906



Collection of Grains from the State Farm, Hamel ton. Under the new scale of charges the miller would, however, apply for a rebate as though the consignment had been sent from Beverley to Kalgoorlie at the long-distance rate, under which the rate would be £1 3s. 5s. plus 1s. 6d. extra charge for break of journey at Northam. The rebate, therefore, would amount to 2s. 3d. per ton. Under the old rate the amount that would have been paid for freight on the same consignment would have been £1 9s. 5d. as against £1 4s. 11d. under the new schedule, or a difference of 4s. 6d. per ton. It may be pointed out that this example is not a particularly good one as showing the reduction made, because of the inequality between the two distances. The longer the distance the greater will be the reductions. For instance, the rate now charged per 100 miles is 10s. 2d. per ton, for 150 miles 12s., for 200 miles 13s. 9d., and for 250 miles 15s. 1d. On grain for export, in addition to the rebate already mentioned, the Government will allow a further rebate of 12½ per cent. The following are the rates which came into force on Monday, 28th inst. :—

THE SCALE OF CHARGES.

Special rates for grain from stations on the Eastern and Eastern Goldfields, Great Southern and Northern Railways to mills for gristing purposes only, and to apply to truck loads of six tons and upwards:—

Distance.	New rate.	Old rate.	Distance.	New rate.	Old rate.
	s. d.	s. d.		s. d.	s. d.
1 to 10	2 6	2 6	145 to 150	12 0	13 9
11 to 15	3 4	3 4	151 to 155	12 2	14 0
16 to 20	4 2	4 2	156 to 160	12 4	14 2
21 to 25	4 10	4 10	161 to 165	12 7	14 5
26 to 30	5 4	5 5	165 to 170	12 9	14 7
31 to 35	5 10	6 1	171 to 175	12 11	14 9
36 to 40	6 4	6 8	176 to 180	13 1	15 0
41 to 45	6 10	7 4	181 to 185	13 3	15 2
46 to 50	7 2	7 11	186 to 190	13 5	15 5
51 to 55	7 6	8 7	191 to 195	13 7	15 7
56 to 60	7 10	9 1	196 to 200	13 9	15 9
61 to 65	8 2	9 6	201 to 205	14 0	16 0
66 to 70	8 6	9 11	206 to 210	14 2	16 2
71 to 75	8 10	10 4	211 to 215	14 4	16 5
76 to 80	9 3	10 9	216 to 220	14 6	16 7
81 to 85	9 8	11 2	221 to 225	14 8	16 9
86 to 90	9 10	11 4	226 to 230	14 10	17 0
91 to 95	10 0	11 7	231 to 235	15 0	17 3
96 to 100	10 2	11 9	236 to 240	15 3	17 6
101 to 105	10 5	12 0	241 to 245	15 7	17 9
106 to 110	10 7	12 2	246 to 250	15 11	18 1
111 to 115	10 9	12 5	251 to 255	16 3	18 6
116 to 120	10 11	12 7	256 to 260	16 7	18 10
121 to 125	11 1	12 9	261 to 265	17 0	19 2
126 to 130	11 3	13 0	266 to 270	17 4	19 6
131 to 135	11 5	13 2	271 to 275	17 8	19 11
136 to 140	11 8	13 5	276 to 280	18 0	20 3
141 to 145	11 10	13 7			

For 281 miles onwards a rebate of 2s. per ton on grain rates will be allowed.

The gristed products of grain previously carried over the Government railways at the rates just mentioned, and afterwards despatched from the mills to any station on the system, will be allowed a recoup of the difference between the two short distance rates and the through mileage rate. In addition, a charge of 1s. 6d. per ton will be made on all traffic of this character, on account of the broken journey. The grain rates detailed above will be applicable to the gristed products, whether the grain was originally conveyed to the mill by rail or carted by road.

GRAIN FOR EXPORT.

Rates as detailed above will be charged when grain or its product are sent by rail for shipment from either Fremantle, Albany, Bunbury, or Geraldton, and a rebate of 12½ per cent. will be allowed therefrom. The demurrage paid on trucks used for grain, etc., traffic, will also cover the demurrage charge on sheets. In respect to the special gristing allowance the mileage rate for each portion of the journey will be charged in the first instance for the total quantity of flour, bran, pollard, and sharps consigned by rail from each flour mill, and rebate to the amount of the charges computed as specified will afterwards be granted on all or so much of the tonnage of the flour, bran, pollard, and sharps consigned by rail from the flour mill as does not exceed the tonnage of the wheat consigned by rail from any country station or stations for the flour mills. In determining the amount of the rebate due to the quantity of wheat consigned by rail from the most distant despatching station to the flour mill, and the quantity of flour, bran, pollard, and sharps forwarded from the flour mill to the most distant destination station will be the first taken into account, and then the quantity of wheat similarly consigned from each succeeding despatching station, and the quantity of flour, bran, pollard, and sharps forwarded to each destination, in order of greatest distance

STATEMENT BY MR. MITCHELL.

When asked what he thought of the new schedule, the Minister controlling the Agricultural Department (Mr. James Mitchell, M.L.A.) said that from the point of view of the farmer they represented a material benefit.

"The reduction of the special rate," continued Mr. Mitchell, "is in itself a great advantage; but to my mind the chief boon to the farmer is furnished by provision for a freight right through the mills. In other words, the farmer pays one freight from the fields to the market, and thus ignores the break in the journey occasioned by the unloading of the wheat at the mill, and the reloading of its equivalent in flour and by-products. Under the existing schedule a producer sending his wheat a distance of, say, 100 miles to the mill would be required to pay 10s. 2d.; the miller sends the flour, say, another 100 miles to a baker, and for this he is required to pay another 10s 2d.; making a total for the 200 miles of £1 0s. 4d. Under the new schedule the total freight paid on such a consignment for a similar journey would be 13s. 9d., plus 1s. 6d. for charges in connection with these special rates. Here you have at once a direct saving of 5s. 1d. There can be no doubt that these through-the-mill freights will prove of great assistance to the farmer. For one thing, it enables the grower to select for the gristing of his grain any mill between him and the market. At one time the distance between his fields and the mill was a matter of the utmost importance. Under the new schedule the mills will all be available to the farmer on an equal footing. A third boon conferred by the new tariff is the 12½ per cent. rebate allowed on all grain for export. This will have the effect of placing our exporters on equal terms with the exporters of the Eastern States. Altogether, and speaking rather as a farmer than a member of the Cabinet, I am perfectly satisfied that all that can be done for us just now in respect to railway freights has been done. The alterations made in the tariff reflect great credit on Mr. George, the Commissioner of Railways."—*West Australian.*

HELPING THE PRODUCER.

SUGGESTIONS TO THE GOVERNMENT.

REDUCTION IN RAILWAY FREIGHTS.

LOWER WHARFAGE CHARGES.

COOL STORAGE AND GOVERNMENT SALEYARDS.

WHAT IS TO BE DONE.

Some important proposals, designed to foster the producing industry in Western Australia, were placed before the Government by a deputation that recently waited on the Premier. The deputation, which was of a large and influential character, represented pastoralists and stock-owners with large interests in the Nor'-West, and producers generally throughout the State.

Mr. Butcher, M.L.A., introduced the deputation, which, he said, desired first of all to lay before the Premier the following resolutions, passed at a meeting of those interested in the producing industries:—

1. "That, in the opinion of this meeting, it is desirable, in the interests of the State, that all goods for export should be carried on the railways at special low rates, and that a differentiation should be made in wharfage rates as between goods for export and goods for local consumption."

2. "That, in the opinion of this meeting, it is desirable that the erection of efficient stock saleyards at Owen's Anchorage should be no longer delayed, and that the Government be asked to undertake the erection of same and of cool storage in connection therewith; and, further, that it is desirable that the control and management of same should be in the hands of stockowners, through their representatives, with the object of regulating and maintaining a regular supply for the metropolitan requirements."

3. "That it is important that cool storage should be established at Owen's Anchorage, for the purpose of dealing with extra heavy supplies of meat, and for dealing with lambs for export."

The deputation, Mr. Butcher added, suggested that there should be some reduction in the railway freights on produce for export, that stock saleyards be established at Owen's Anchorage, with Government cool stores attached. It was also considered desirable that some slight reduction should be made in the wharfage rates, which would give local producers some slight preference over people outside.

Mr. Charles Harper said that the first resolution touched closely the question of the export of produce. If the farming and producing interests were to go ahead, the stuff produced locally must be carried at lower rates. They all knew that the shipping companies had combined and were using their best endeavours to keep up freights. This, combined with high railway rates, placed Western Australian producers in an inferior position as compared with those whom they had to compete against in the Eastern States. The deputation asked for a differentiation in the wharfage rates, because, at the present time, the margin of profit was so low that people hesitated to enter into the export business. The second resolution was of extreme importance. At the present time the metropolitan stock market was supplied from a considerable distance, both outside and inside the State. Under present conditions an enormous loss took place in connection with the marketing of stock, a loss which, of course, had to be borne by the public to a great extent. Frequently it happened that when stock arrived at Fremantle the supply more than equalled requirements, and the consequence was that, while the market was glutted, stock wasted away. Another difficulty presented itself to the stock-raiser in arriving at the real weight of the live stock sent into the market. The stock were reduced in weight during the sea voyage, and still further reduced every day they were kept, until being slaughtered. If the Government would erect yards which would become the stock sale yards of the metropolitan area, any man, even with a few head, could send his stock down to the yards. Then, if the stock could be slaughtered immediately, the carcases could be kept in the cool stores until the market was favourable.

The Premier: The idea would be to have the cool stores adjacent to the saleyards?

Mr. Harper: Exactly.

The Premier: That would suit only the stock brought by steamer.

Mr. Harper: No, it would apply also to the stock brought in by rail. The establishment of such yards and cool storage accommodation would be an enormous step forward in the interest of the stock-producer. If the Government would carry out this work which was, after all, only a moderate undertaking, it would be of enormous benefit to the public, as well as to the trade.

Mr. A. R. Richardson remarked that the shipping companies had lowered their freights from the Eastern States to Western Australia down to bedrock, in order to encourage a carrying trade. The result was that producers in South Australia and Victoria could land their stuff at Fremantle at probably one-half the cost of sending produce 100 miles by rail in this State.

The Premier: What is about the sea freight—10s. per ton?

Mr. Connor: Some of the freights are down to 7s. 6d.

Mr. Richardson said produce could not be sent far in Western Australia for 7s. 6d. With regard to the wharfage rate, he thought it was

Court of the Department of Agriculture at the Chamber of Manufactures' Exhibition, 1906.

Model Silo.

quite legitimate for the State to protect its own exports without exhibiting any anti-Federal spirit or anything of that sort. This State was now just embarking upon an export trade, and there were always initial difficulties connected with the establishment of any industry. It was therefore all the more necessary that the wheels of trade in this instance should be lubricated, so that exporters here might be enabled to get into line with those in the other States. He referred to the export of fat lambs, wool, wheat, and other agricultural produce. Reverting to the stock trade, he desired to point out that sheep during a sea voyage lost about 2lb. per day and beasts about 10lb. per day. That was bad enough, but it was worse that after they had reached their destination a temporary glut in the market should compel them to be kept starving and wasting away in the yards. It would mean an enormous saving if cattle could be slaughtered immediately and put into chilling chambers, not freezing chambers, until the temporary glut was tided over.

Mr. Connor said that, speaking from a wholesale butchers' standpoint, it would be quite impossible to establish an export lamb trade without there was some central establishment. There must be some central depôt for killing, and this, he thought, should be established at Owen's Anchorage. All the accessories were there at present, and he thought it would be the best possible site for a central establishment. A very small expenditure in dredging would make it possible for steamers requiring to load frozen lambs to come alongside the wharf.

The Premier: What depth is there now?

Mr. Connor: About 20 feet. The jetty was, however, being extended about two ships' lengths farther along. If the chilling rooms were built close to the jetty, it would save unnecessary handling of the produce. Frozen meat could be run straight into the ship's hold from the chambers by one of those endless rollers now used. If the Government would erect these cool chambers it might be asked why should not the Government take over the whole of the abattoirs and other appliances, thus making it entirely a Government system. The people would be better satisfied if the whole thing were placed under Government supervision and one large centre established for the handling of the whole meat supply of the metropolitan area. The small abattoirs outside could then be done away with. To make the system complete the Government would then require to have proper cars for the carrying of chilled meat between the Eastern Goldfields and any centre that might be chosen for the Government establishment—which, in his opinion, should be Owen's Anchorage. (Hear, hear.) The establishment of such a system as he had outlined would be of benefit not only to the metropolis but to the people of the goldfields, and it would do away with much of the waste and cruelty that could not be avoided under present circumstances. The system would pay for itself, if not immediately, in the very near future. (Hear, hear.)

The Premier, in reply, said he need hardly say that any practical suggestions brought forward by the gentlemen who constituted the deputation, who were interested in the trade and had the best interests of the State at heart, were welcomed by him as being worthy of the utmost consideration. The first resolution they had presented to him dealt with the reduction of railway freights on goods for export. They were all aware that at present producers in Western Australia were having rather a bad time. There were several reasons for this. In the first place, the sliding scale had been abolished; and, secondly, there had been rather a poor season, and the prices received had not, as had been the case in the past, compensated in many instances for the poor crop. Again there had been a bountiful harvest in the Eastern States, and the low sea freights made it easy for the Eastern farmer to compete against the producer here. In the circumstances, the Government recognised that at the present time the Western Australian producer was deserving of every consideration He had already gone into this question of freights, and a schedule was being drawn up which it was hoped would have the effect of relieving the man on the land very considerably. It was intended to make a slight general reduction, but it was proposed to make a special reduction of about 12½ per cent. on all products of the ground to all ports of shipment. The Government thought they were justified in making this reduction, although they were well aware that anything that tended towards a diminution of the revenue must receive very careful consideration. However, he regarded the policy the Government was pursuing as a good one, because if some assistance were not given to the producer in the way suggested, many of the large areas now under cultivation would, in the next year or two, instead of producing grain, be turned into sheep-walks. He considered that the salvation of the man on the land lay in turning his attention to mixed farming, and the Government hoped, by the little assistance they proposed to give, to tide the producer over the bad time he was having at present. The next question was in regard to the erection of stock sale yards at Owen's Anchorage. The deputation had specified the locality. At first he thought that might not be the most suitable site, and that it would serve only a steamer trade, but it had just occurred to him that Owen's Anchorage would be in close proximity to the junction of the Armadale line with the South-Western system. In that respect Owen's Anchorage, as a site, would have some advantages. The Government intended to go on with the erection of sale yards, but before he could say any more he desired to consult with his colleague, Mr. Mitchell, who took a very great interest in this question. He hoped, however, that he would be in a position to give effect to the wishes of the deputation in this regard. It seemed to him that the views of Mr. Connor were not quite in accord with the resolution. Mr. Connor suggested that the yards should be taken over entirely by the Govment. The resolution stated that the management should be in the hands of the stockowners, through their representatives.

Mr. Connor: I suggested that in case you went in for the larger scheme and took over everything.

The Premier: Took over yards, abattoirs, and cool stores?

Mr. Connor: Yes.

The Premier said it had been pointed out that there were many difficulties in the initial stages of any undertaking. In regard to the export trade, the Government recognised that it was their duty to help exporters over the style at the start. Provision was made on the last Estimates for a vote of a considerable amount for development work, and it was the intention of the Government then to go in for cool storage. It was suggested that possibly North Fremantle would be a good site. It was now pointed out by Mr. Connor that there was good jetty accommodation at hand at Owen's Anchorage, and it was worthy of consideration whether that would not be a more suitable site than the other.

Mr. Richardson: You can't beat Owen's Anchorage.

The Premier: Officers of the Stock Department suggest that it would be a suitable site for cool storage works.

Mr. Richardson: When I was in office it was decided that Owen's Anchorage was the best site for cool stores.

The Premier: I don't know whether we have the land there.

Mr. Connor: There is plenty of land. That need not bother you.

The Premier: What sort of a place would it be for sale yards? There are no paddocks there.

Mr. Harper: The best paddock would be the cool stores.

The Premier: You mean paddock them after they are dead? (Laughter.)

Continuing, the Premier said that on the matter of wharfage charges he had anticipated their resolution to some extent. Last week he asked his colleague the Colonial Secretary to confer with the Harbour Trust with a view to giving effect to the resolution they had put forward. They were, no doubt, aware that this was a difficult question. It was not easy to say how far they could go in differentiating between local charges and charges on goods elsewhere. After all, it was a mild form of protection. However, the Government could try it, and when they were hauled up they could argue the point. There was no doubt some relief could be given by additional imposts, and the Harbour Trust was drawing up a schedule which he hoped to have the opportunity of considering this week. When the schedule had been decided upon he would be glad to forward them a copy.

Mr. Harper: Will it apply to wheat?

The Premier: We propose to apply it to wheat, chaff, and anything for export. I am glad to have had the opportunity of hearing your views, and I shall take the opportunity of consulting you at a later date on the details of the proposals. I recognise that it is necessary, on questions of this kind, that we should have the advice of people intimately associated with the trade.

The deputation thanked the Premier for his reply —*West Australian.*

EXPORT OF FAT LAMBS.

AN EXPERIMENTAL SHIPMENT.

GOOD CONDITION, GOOD MARKET, GOOD PRICES.

In November last the Western Australian Producers' Co-operative Union despatched a shipment of fat lambs to the London market. The account sales received from London by the last mail disclose a result that can only be described as highly satisfactory.

The shipment, it will be remembered, was sent per the R.M.S. *Britannia,* and, according to the London agent, reached England in very good condition. Partly by reason of the circumstance that the carcases met an exceptionally good market, the values realised were gratifyingly high. The local charges appear low. This is directly attributable to the fact that each and all of the firms connected with the preparation of this trial consignment rendered their respective services at, if anything, less than actual cost, in a common endeavour to insure the success of this the first shipment of lambs from Western Australia. The Producers' Union is indebted to Messrs. Connor, Doherty, and Durack for the slaughtering of the animals; and to the Western Fresh Food and Ice Company for the freezing, bagging, and final preparation for export. The manner in which this work was carried out, under the direction of Mr. Davy, the manager, shows that Western Australia is not behind in a proper knowledge of the important business.

Appended are the account sales in detail, with the London expert's comments on each lot:—

On account of Messrs. J. and C. Butcher.

	£ s. d.	£ s. d.	£ s. d.
By sales 197 lambs—Average 30lb.			149 9 9
By pelts—200 at 1s. 2d.			11 13 4
			£161 3 1
Average per lb., 6⅛d.			
Less London charges—	£ s. d.	£ s. d.	
Storage, receiving and delivering	3 18 0		
Fire insurance	0 3 0		
Commission, 2 p.c.	2 19 9		
		6 16 6	
Fremantle charges—			
Proportion freight	12 6 0		
Freezing, bagging, etc., 197 ccs. at 7d.	5 14 1		
Wharfage, 197 ccs, at 2d.	1 12 10		
Proportion extra labour killing	2 11 4		
Proportion railage and engine hire from Robb's	1 15 0		
Proportion insurance	2 0 0		
Union's commission, 2½ p.c. on £161 3s. 1d. ...	4 0 7		
		30 0 8	
			36 16 8
			£124 6 5

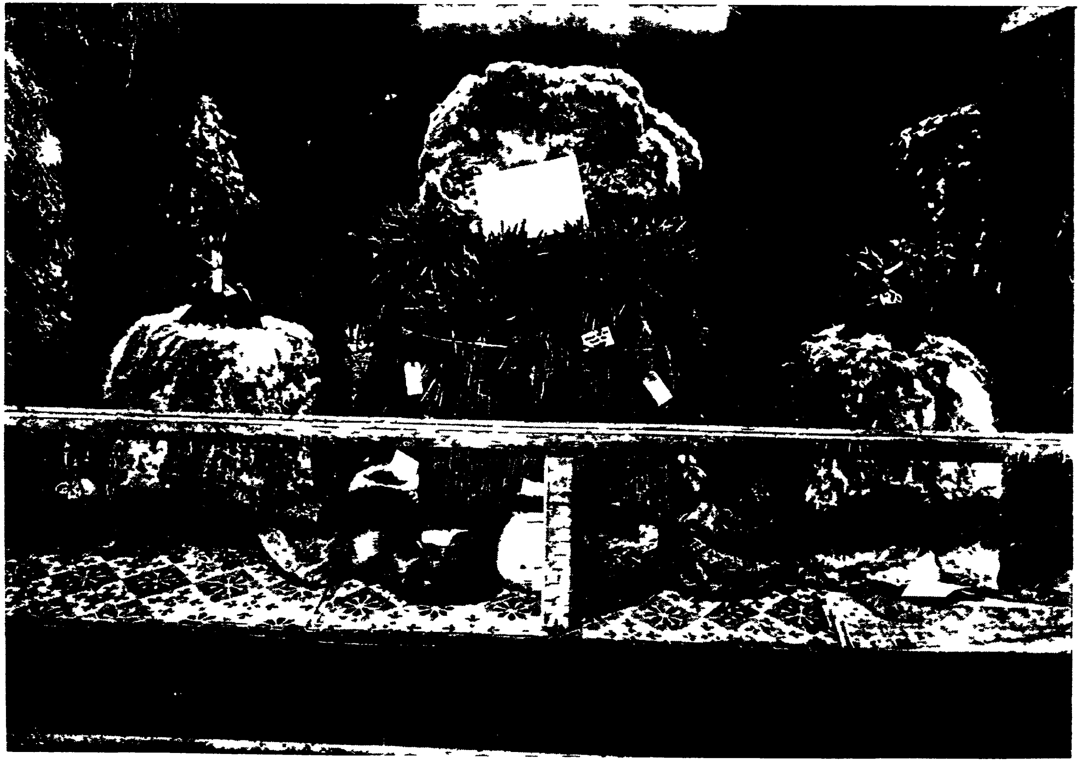
London Report.—Fair quality, but too thin and plain.

On account of V. Hamersley.

	£ s. d.	£ s. d.	£ s. d.
By sales 55 lambs—Average 34lb.			49 12 3
By pelts, 55 at 1s. 8d.			4 11 8
			£54 3 11
Average per lb., 6¼.			
Less London charges—	£ s. d.	£ s, d.	
Storage, receiving, and delivering	1 3 7		
Fire insurance	0 1 0		
Commission, 2 p.c	0 19 10		
		2 4 5	
Less Fremantle charges—			
Proportion freight	3 18 1		
Freezing, bagging, etc., 55 ccs. at 7d.	1 12 1		
Wharfage, 55 ccs. at 2d.	0 9 2		
Proportion extra labour killing	0 14 6		
Proportion railage and engine hire from Robb's Jetty	0 10 6		
Proportion insurance	0 11 4		
Union's commission, 2½ p.c. on £54 3s. 11d. ...	1 7 2		
		9 2 10	
			11 7 3
			£42 16 8

London Report.—Many of these were very good quality and useful size, but some were very thin and plain. Very useful size for the provinces.

COURT OF THE DEPARTMENT OF AGRICULTURE AT THE CHAMBER OF MANUFACTURES' EXHIBITION, 1906.



Collection of Produce from State Farm, Chapman

On account of Messrs. Forrest, Emanuel and Co.

	£ s. d.	£ s. d.	£ s. d.
By sales 42 lambs—Average 30lb.			32 5 7
By pelts			2 9 0
			£34 14 7
Average per lb. 6⅛d.			
Less London charges—			
Storage, receiving, and delivering	0 15 10		
Fire insurance	0 0 8		
Commission, 2 p.c.	0 12 11		
		1 9 5	
Less Fremantle charges—			
Proportion freight	2 13 1		
Freezing, bagging, etc., 42 ccs. at 7d.	1 4 6		
Wharfage, 42 ccs. at 2d.	0 7 1		
Proportion extra labour killing	0 11 1		
Proportion railage and engine hire from Robb's Jetty	0 7 0		
Proportion insurance	0 8 7		
Union's commission, 2½ p.c. on £34 14s. 7d.	0 17 4		
		6 8 7	
			7 18 0
			£26 16 7

London Report.—Fair quality, but too thin and plain.

On account of Messrs. Wedge and Harper.

	£ s. d.	£ s. d.	£ s. d.
By sales 60 lambs—Average 40lb.			66 5 1
By pelts, 60 at 3s.			9 0 0
			£75 5 1
Average per lb. 6⅝d.			
Less London charges—			
Storage, receiving, and delivering	1 10 4		
Fire insurance	0 1 4		
Commission at 2 p.c.	1 6 6		
		2 18 2	
Less Fremantle charges—			
Proportion freight	5 1 8		
Freezing, bagging, etc., 60 ccs. at 7d.	1 15 0		
Wharfage, 60 ccs. at 2d.	0 10 0		
Proportion extra labour killing	0 16 0		
Proportion railage and engine hire from Robb's Jetty	0 10 6		
Proportion insurance	0 12 4		
Union's commission, at 2½ p.c. on £75 5s. 1d.	1 17 6		
		11 3 0	
			14 1 2
			£61 3 11

London Report.—Very good quality, well matured, size rather large for general use, especially in the provinces. There is always, however, a fair demand for a moderate supply of large lambs in London. Well-bred tegs up to 50lb. with legs well covered, but not too fat, also sell well.

On account of Messrs. McLean Bros.

	£ s. d.	£ s. d.	£ s. d.
By sales 27 lambs—Average 28½lb.			18 14 3
By pelts, 27 at 1s. 4d.			1 16 0
			£20 10 3
Average per lb., 6d.			
Less London charges—			
Storage, receiving, and delivering	0 9 8		
Fire insurance	0 0 4		
Commission at 2 per cent.	0 7 6		
		0 17 6	
Less Fremantle charges—			
Proportion freight	1 12 2		
Freezing, bagging, etc., 27 ccs. at 7d.	0 15 9		
Wharfage, 27 ccs. at 2d.	0 4 6		
Proportion extra labour killing	0 7 1		
Proportion railage and engine hire from Robb's Jetty	0 5 0		
Proportion insurance	0 5 6		
Union's commission 2½ per cent. on £20 10s. 3d.	0 10 3		
		4 0 3	
			4 17 9
			£15 12 6

London Report—Very thin and poor.

POULTRY NOTES.

By Frank H. Robertson.

POULTRY AS A PARASITE IN THE ORCHARD.

One hears and reads so much about the damage done in gardens and orchards by pests of various kinds, such as slugs, cut-worms, grubs, codlin moth, fruit fly, etc. The remedies generally recommended are spraying with Paris green, or placing a mixture of bran, Paris green, and treacle on the ground among the trees. Now to my mind such methods are not the way I should adopt to fight these pests, but of course I am not an orchardist and some will say do not know what I am talking about, but I do know this, that I have saved a crop of rape from total destruction by the introduction of a mob of young chickens. When first put in, the foliage was fast disappearing from the ravages of a caterpillar, but the chickens soon got rid of the pest, and did no harm to the greenstuff, which eventually grew up to a fine crop. Why could not the same thing be done in the vegetable garden and the orchard, but somehow or other fruitgrowers and market gardeners seem quite to forget about the ordinary chicken or duckling as a likely means of getting them out of their troubles? The idea is so firmly planted that poultry could only do damage in a garden, that all endeavours are made to keep them away as far as possible from growing vegetables, flowers, or fruit trees. A great mistake is made there. I must certainly admit that full-grown hens turned loose into a bed of cabbages will soon make short work of them, or do a lot of harm among ripe grapes, but by the judicious handling of small chickens and young ducklings no harm can be done to the growing greenstuff, and the pests would be kept in check, and at the same time the young birds would thrive to the best advantage.

The way to do it would be to keep the hens with chickens in coops, but allow the chickens to run in and out, and if shifted every day a dozen lots could soon cover a large area of garden land, or ducklings could be used if preferred, and again full grown fowls could be employed if movable covered runs are made; besides the fowls would do so well under such conditions. The combination of fruit and poultry is such a good one, if only carried out in a systematic manner, that it is quite surprising that so few orchardists go in for it.

CHEAP FEED.

The low prices of the staple poultry feeds, viz., wheat, bran, and pollard, are hailed with much satisfaction by poultry-keepers, for it is a remarkable fact that when feed is dear eggs and poultry do not correspondingly increase. Why, it is so is hard to say. But what about the poor farmer, who can only get 2s. 6d. a bushel for his wheat? He probably has no fowls, so reaps no benefit whatever; he has his bills to meet, so must sell. Now, I contend that this is just where so many farmers err grievously; if they only went in more for mixed farming, had a few cows, some sheep, pigs, and poultry, the last-named alone would tide a struggling settler over a tight pinch, for I am quite sure that there is not a farmer in this State but who could make his poultry pay his grocer's bills if he only went the right way about it; there are some who do, but they are few and far between. To make a success of poultry, it means a lot of what is considered trifling and fiddling work, and an attention to little details that are not congenial to the ideas of the "man on the land," but the ordinary city folk have to undertake much hard work which is not pleasant to make both ends meet. The days are gone by for the West Australian farmer to be besieged by buyers of chaff and wheat at double present prices; the duties are all gone, and he has now to face the world's markets; and, if he cannot make wheat and chaff keep him, he will have to work a bit harder and turn the stuff he grows into live stock, of which there is a stronger demand. And there stands right out three things he can produce, and of which we have to import enormous quantities, viz., bacon, butter, and eggs. These three work well together, and the man who turns his low-valued crops into these more marketable products is not a sufferer when markets reach the present low ebb.

The present time of cheap feed is sure to result in more attention being paid to poultry, and it is safe to predict that the coming season will see a strong demand for birds and eggs,

THE PRICES OF PURE-BRED POULTRY.

Persons who are accustomed to consider about 6s. a pair for fowls quite as much as they are worth, and 1s. a dozen for eggs a good price, are quite staggered on receiving a reply from the advertiser of pure fowls that his prices range from 10s. to £1 each for birds, and the same quotations per dozen for eggs for the setting. He cannot understand such prices, declines to buy, and prefers to keep to the mongrels he has on hand; but when one considers the heavy expenses the seller of good stock is under, it is quite easily seen that the prices asked are only a fair recompense. In the first place, he has to pay high prices to get good specimens, probably three or four times as much as is asked for the progeny; then he has to keep each bird separate, which means the expense of erecting special runs, and to supply customers many birds are kept on hand which would not otherwise be the case, and when selling the expense of advertising has to be incurred, and answering inquiries entails a lot of work. The actual work of forwarding poultry by rail means much time and trouble; special crates have to be made, and, above all, if satisfaction is to be given, the stock must be sent away in perfect condition, and must be of good quality; he breeds lots of culls only fit for the pot. All this extra attention means increased time and expense, hence the extra price asked to recompense the breeder who raises good pure-bred poultry for stock purposes.

POULTRY AT THE NARROGIN FARM.

The stock are all looking well, and yielding a good supply of eggs. The breeding pens are all broken up, and no eggs are now for sale for setting purposes, neither is such advisable, as late-hatched birds seldom give satisfaction on account of the slow growth they make during the summer months; but as soon as the hot weather is over a commencement should be made with breeding operations. There are now for sale a nice lot of White and Brown Leghorn cockerels, Silver Wyandotte cockerels—all good, strong, early-hatched, vigorous birds; also Pekin and Indian Runner drakes.

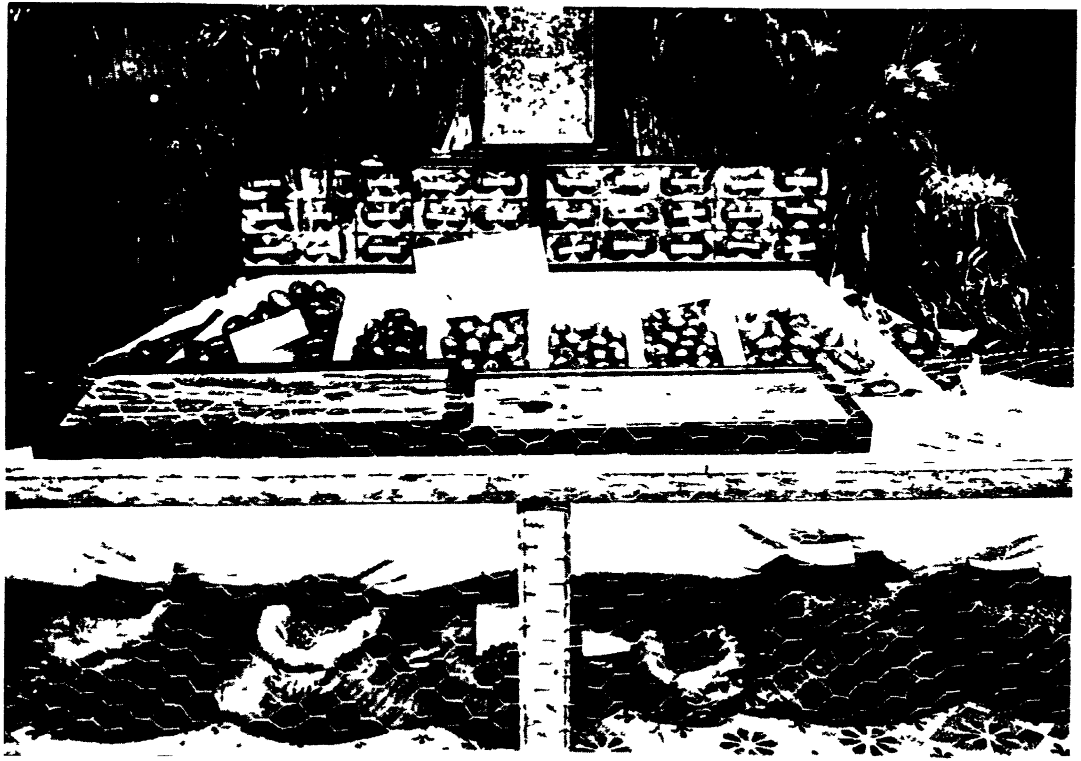
EGG-LAYING COMPETITION.

NARROGIN MONTHLY RECORD.

The following are the results of the egg-laying competition at the State Farm, Narrogin, for the eight months ended with December last. There are still four months to run:—

	Breed.	Owner.	Total for Month.	Total to Date.
1.	Brown Leghorns	E. E. Ranford	104	870
2.	White do.	Mrs. A. Bristow	89	854
3.	Silver Wyandottes	A. M. Neitschke	103	846
4.	White Leghorns	F. Piaggio	110	764
5.	Buff Orpingtons	A. H. Hilton	77	762
6.	White Leghorns	C. W. Johnson	103	754
7.	Brown Leghorns	Mrs. R. Dusting	116	749
8.	White Leghorns	Miss M. Parker	108	696
9.	Do. do.	Aveley Yard	127	692
10.	Silver Wyandottes	Miss Buttsworth	54	678
11.	White Leghorns	A. F. Spencer	82	670
12.	Do. do.	J. Handley	95	656
13.	Black Orpingtons	Sparks & Binnington	79	648
14.	Brown Leghorns	J. D. Wilson	79	641
15.	Silver Wyandottes	G. W. G. Lizars	62	633
16.	R.C. Brown Leghorns	Adelaide Yards	93	624
17.	White Leghorns	F. J. Williams	92	622
18.	White Wyandottes	Mrs. S. J. Hood	55	607
19.	Golden Wyandottes	W. J. Craig	71	583
20.	White Leghorns	R. G. Flynn	84	579
21.	Black Orpingtons	Perth Yards	72	577
22.	White Leghorn	J. E. Tull	101	567
23.	Do. do.	O. C. Rath	100	542
24.	R.C. Brown Leghorns	E. Krachler	66	542
25.	White Leghorns	G. Oneto	81	528
		Totals	2,203	16,727

COURT OF THE DEPARTMENT OF AGRICULTURE AT THE CHAMBER OF MANUFACTURE EXHIBITION 1906



Collection of Potatoes, etc., from State Farm Hamel

SUBIACO MONTHLY RECORD—DECEMBER.

[Commenced on July 1. To close on June 30, 1907.]

FOWLS.

Six hens in each pen.

	Owner and Breed.	1906. Dec.	Total for six months.
1.	Sunnyhurst (S.A.), *W. Leghorn	145	874
2.	A. H. Padman (S.A.), *W. Leghorn	140	810
3.	S. Craig, *W. Leghorn	128	763
4.	J. D. Smith, *W. Leghorn	113	736
5.	E. Garbett, W. Leghorn	116	718
6.	Ericville Egg Farm, *W. Leghorn	109	713
7.	G. W. G. Lizars, *W. Leghorn	116	711
8.	A. H. Padman (S.A.), *S. Wyandotte	92	706
9.	Ryan Bros., *W. Leghorn	147	701
10.	W. J. Clarke, Brown Leghorn	104	699
11.	Austin and Thomas, W. Leghorn	115	697
12.	E Fitzgerald, W. Leghorn	115	693
13.	F. Whitfield, Brown Leghorn	102	688
14.	Bungalow Farm, Brown Leghorn	108	687
15.	J. R. Parkes, Brown Leghorn	123	683
16.	A. F. Farrant, Partridge Wyandotte	90	683
17.	E. Palmerston, W. Leghorn	128	678
18.	F. Piaggio, W. Leghorn	95	671
19.	Mrs. McGree, *W. Leghorn	97	660
20.	Bon Accord, W. Leghorn	115	659
21.	C. W. Johnson, *W. Leghorn	87	656
22.	G. M. Buttsworth, *W. Leghorn	111	656
23.	F. T. Rowe, *Buff Orpington	88	650
24.	J. W. Buttsworth, *W. Leghorn	108	634
25.	Bungalow Farm, *W. Leghorn	87	630
26.	W. Snowden, Brown Leghorn	118	626
27.	F. Whitfield, *W. Leghorn	89	625
28.	Adelaide Yard, W. Leghorn	85	623
29.	A. Snell, *Brown Leghorn	97	621
30.	C. Attwell, *S. Wyandotte	73	615
31.	H. Jones, W. Leghorn	96	617
32.	A. S. B. Craig, *W. Wyandotte	77	597
33.	A. R. Keesing, Minorcas	92	585
34.	E. Hutchinson, *Minorcas	74	585
35.	L. Meatchem, *G. Wyandotte	77	584
36.	B. Jones, *S. Wyandotte	63	582
37.	Mrs. Hughes, *R. C. B. Leghorn	104	582
38.	R. G. Flynn, W. Leghorn	69	581
39.	J. White, Brown Leghorn	110	576
40.	Ericville Egg Farm, *Black Orpington	76	573
41.	O. K., *Black Orpington	96	571
42.	W. Wade, W. Leghorn	85	560
43.	C. R. Roberts, *W. Leghorn	83	557
44.	Perth Yard, W. Leghorn	84	549
45.	H. M. Kelly, *G. Wyandotte	95	547
46.	Geo. Bolger, *Black Orpington	76	544
47.	C. L. Braddock, S. Wyandotte	59	533
48.	J. W. Buttsworth, S. Wyandotte	59	530
49.	W. Snowden, S. Wyandotte	84	526
50.	F. Mason, W. Leghorn	78	522
51.	Honnor and Forbes, R. C., W. Leghorn	69	519
52.	Glen Donald Yard, G. Wyandotte	74	518
53.	A. Coombs, S. Wyandotte	70	512
54.	E. A. Newton, W. Leghorn	85	510
55.	R. G. Smith, W. Wyandotte	79	508

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* Male birds were placed in these pens on August 1.

FOWLS—*continued.*

Owner and Breed.	Dec.	Total for six months.
56. C. Crawley, B. Orpington	83	505
57. H. M. Kelly, *B. Orpington	85	471
58. Mrs. McGree, W. Wyandotte	73	463
59. A. Savage, Minorca	74	462
60. J. S. Miller, S. Wyandotte	86	458
61. J. E. Redman, S. Wyandotte	71	449
62. Jas. Kirk, G. Wyandotte	70	444
63. H. H. Wegg, G. Wyandotte	57	435
64. J. B. Pettit, S. Wyandotte	67	407
Total	5,921	38,518

DUCKS.

Four in each Pen.

1. R. A. Dusting, *Indian Runner	115	617
2. Austin and Thomas, *Indian Runner	109	564
3. E. A. Newton, Indian Runner	66	536
4. F. T. Rowe, Indian Runner	97	525
5. Miss E. Parker, Indian Runner	92	524
6. Adelaide Poultry Yard, Indian Runner	103	522
7. A. Snell, *Indian Runner	81	518
8. C. E. Close, Indian Runner	84	503
9. Mrs. L. Mellen, *Indian Runner	59	501
10. Ericville Egg Farm, *Buff Orpington	87	489
11. Bon Accord, *Buff Orpington	72	480
12. G. Stead, *Indian Runner	55	474
13. Perth Poultry Yard, *Buff Orpington	71	472
14. F. D. Vincent, *Indian Runner	113	466
15. W. Snowden, *Buff Orpington	54	450
16. J. R. Parkes, Indian Runner	82	433
17. C. W. Johnson, *Indian Runner	98	432
18. S. Craig, Indian Runner	79	432
19. Aveley Poultry Yard, Indian Runner	104	427
20. F. Piaggio, Buff Orpington	99	386
21. Sargenfri (S.A.), *Buff Orpington	64	381
22. J. B. Pettit, Indian Runner	105	377
Total	1,889	10,509

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* Male birds were placed in these pens on August 1, 1906.

£150,000 SENT AWAY YEARLY FOR PORK.

LOW PRICES FOR WHEAT AND THEIR REMEDY.

SUGGESTIONS BY A BACON EXPERT.

In March last the official opening of Messrs. Hutton's bacon factory at South Fremantle took place under encouraging auspices. The then Premier (Mr. C. H. Rason) attended, and made a glowing speech in favour of the new establishment. In the course of his remarks, Mr. Rason pointed out that during the last ten years bacon, ham, and pork to the value of £1,037,361 had been imported into the State. The factory, he stated, would not only provide direct employment for a large number of people, but would also encourage the agriculturists of the State to embark in mixed farming.

An Up-to-date Establishment.

Hutton's factory, which is situated to the south of Robb's Jetty, and which stands within three miles of Fremantle, bears the name "Wiltshire." It embodies all that is latest and best in such establishments. Hutton's have ham and bacon factories both in Victoria, Queensland, and New South Wales, but the Western Australian installation stands superior to any of them. Profiting by the experiences gained in their other factories, Hutton's have built the Fremantle structure on thoroughly up-to-date lines. It is claimed for it that there is no finer pork factory in the Commonwealth. The firm undertook the whole of the enterprise without any assistance from the State. What land they use they have paid for—the firm think at top rates—and in all they have spent some £14,000 in building and equipping the factory. Standing close by the Coogee railway line, it is connected with it by means of a siding. The completeness of the whole of the arrangements affords convincing evidence of the determination of the firm to prosecute the pork industry in Western Australia vigorously and systematically.

Room for Improvement.

In these days of low prices for wheat, there will naturally be some curiosity evinced as to the scope of the firm's operations. Mr. James Macfarlane, of Macfarlane & Co., Ltd., in an interview published in Friday's *West Australian,* laid stress upon the good prices which local farmers might obtain for their grain if they would convert it into pork. In the course of his remarks Mr. Macfarlane supplied some interesting information as to the manner in which Messrs. Hutton's operations were circumscribed, because of the fact that, relatively speaking, there are few suitable pigs in the State. Mr. Holmes, the local manager for the firm, on being appealed to by a representative of the *West Australian,* gave further particulars in support of Mr. Macfarlane's statements. He also ridiculed the idea of wheat being exported from the country when there was so much work for it to do in the State. Speaking of the pork industry, he said that it was practically at a standstill. Decidedly there was room for improvement.

SENDING MONEY OUT OF THE STATE.

Mr. Rason pointed out twelve months ago how the State had sent away over a million sovereigns in ten years for the products of the pig. The position has not improved. If anything, the importations have grown in scale. According to Mr. Holmes, Victoria—or mainly Victoria—is sending to our shores every year pig products to the value of £150,000. Every week three thousand sovereigns are leaving the country to pay for a commodity which can be abundantly produced in it. And in the face of these facts Mr. Holmes does not regard it as a good commercial transaction to ship to London raw material which might much more profitably be employed in fattening pigs. One year, he recalled, when wheat was very cheap in Victoria, his firm purchased 2,000 pigs for Mr. Lascelles, the "Mallee King" of that State Converted into pork the wheat realised much more remunerative prices than the millers were prepared to give. The result came within a narrow margin of the American experience, which Mr. Macfarlane mentioned in the course of his interview With pork at threepence halfpenny a pound, the wheat returned Mr Lascelles about 3s. a bushel, approximately a shilling more than its market rate as milling grain

BETTER PIGS WANTED.

So far, the firm has not succeeded in persuading the farmers of Western Australia to improve the quality of their pigs to an appreciable extent. With a few well-known exceptions the local swine are poor specimens of the breed. And as Hutton's have attained their success as ham and bacon manufacturers by operating only upon well-shaped pigs, they find it difficult to obtain the necessary raw material. According to Mr. Holmes, a proper type of pig would be fit for the factory at six months old, and would weight from 120 to 130 pounds. The average West Australian pig would take about 18 months to scale that weight, and then, from the slaughterman's point of view, would be badly proportioned

A CHANCE FOR THE STATE FARMS.

Mr. Holmes holds the view that the Government might advantageously introduce a large number of suitable bacon sows into the State, and station them at their various State farms. Here breeding operations could be conducted on a large scale, with a view to distributing their progeny to the settlers. The State would have facilities in importing bacon sows that—owing to restrictive regulations—are denied to private firms. The transaction could be made directly profitable, while its indirect gains would be considerable. At the present time the local factory was employed mainly in putting the finishing touches on pork that came here in pickle from Victoria. In all, eight hands were employed. The factory had a capacity for 1,200 baconers a week. Averaging them at from 120 to 130 pounds weight, and allowing 5d. per lb. for the pork, the firm to be fully employed would require to buy £3,000 worth of pigs every week. And when fully employed it would require the services of from 60 to 80 hands. The £150,000 now sent yearly away for Victorian pork would do incalculable benefit if it were distributed amongst the producers and the workers of the State.

AN UNLIMITED MARKET.

One value of the factory, Mr. Holmes was careful to point out, rests in the fact that by producing an exportable commodity the farmers of the

State are provided with what is practically an unlimited market. For high-grade ham and bacon the English markets are always open, and if the production were in excess of local requirements it would be an easy matter to ship away the surplus. As a matter of fact the firm have realised their best prices for their goods by exporting to London, but, of course, they are bound to regard their Australian connection as the most important. In establishing an up-to-date factory at Fremantle, Hutton's had in view export contingencies. The geographical position of the port and its relative propinquity to the markets of England and Europe were considerations that weighed with the firm. It is their hope that the West Australian factory will ultimately make extensive shipments of pork products to South Africa and Great Britain.

There Must be Mixed Farming.

The pork industry has reached high figures in Victoria because the farmers of that State have been encouraged to embark in mixed farming. In addition, the dairy industry has swelled the number of pig breeders in Victoria. A necessarily very close connection exists between these two industries. Where there is plenty of skim milk there will be always plenty of pigs And according to Mr. Holmes the pork industry is not likely to see large developments in Western Australia until dairying is also prosecuted on an extensive scale. At the same time, considerable numbers of pigs are often obtainable in purely wheat-growing districts where little or no milk is produced. Mixed farming must be the motto of the farmer in Western Australia who would succeed. Mr. Holmes is confirmed in this conviction from a close knowledge of the agricultural districts of the State, backed up with an extensive experience of the rural portions of Victoria. Both dairying and its associated industry have assuredly a great future in this section of the continent. And while the firm have not yet reaped full advantages from the erection of their Fremantle factory, they are not dismayed at the fact. It was estimated it would take two or three years to get things on a satisfactory basis. Their first year's supply of local pigs has been about 1,000. When they started in Brisbane only 420 local pigs passed through their hands the first year. Ten years afterwards the figures ran up to 90,000 They expected a similar experience in Western Australia, although it had to be admitted that the Queensland duty of 2d. per lb. in favour of the local article gave a remarkable stimulus to the local industry. The Victorian bonus system had also worked wonders in indirectly promoting the pork industry of that State. These facts only emphasised the need that existed for steps to encourage mixed farming in Western Australia. It was absolutely certain that pig-raising could be made a most successful industry over large portions of the State.—*West Australian.*

CARE OF HORSES.

It is regrettable that many of our farmers and settlers are wanting in knowledge as to how to care and treat their horses. In very many cases it is through sheer ignorance as to how and what to do in order to care for the health and well-being of their stock. An American exchange publishes a series of notes for the guidance of those who would learn, from which we take the following :—

Sluggish horses are usually made so by the way they are handled.

It is often dangerous to feed musty hay on account of the liability of lung trouble.

Figure out whether it costs less to produce horseflesh worth but five pence a pound than that worth two or three times that much.

It is not so much the quantity of food that requires attention as the assurance that it is suitable.

A diet plentiful and healthy, but not excessive, modifies the size, the form, and the temperament of all animals.

The health of your horses depends as much upon the quality of the food given them as upon the amount of work they are obliged to do.

When the colts are too young to work or train, the best way to develop their muscles is to give them the run of a pasture large enough for them to find room to romp or play.

A horse is never vicious or intractable without a direct cause. If a horse is restive or timorous, you may be sure that these faults arise from defects in his education.

Well bred and well kept horses stand hard usage better at an early age than horses that have had a struggle for existence, and have an inferior quality of blood in their veins.

Horse raising is certainly as full of promise now as any other business farmers can engage in. The greatest object is to start right, and the result will be all right.

There are gluttons among horses as well as among men, and whenever a horse has a tendency to eat more than he can properly digest, he should be prevented from doing so by limiting his rations.

Select the feed with a view to quality. The less bulk the better, so that the strengthening qualities are contained in the food.

Horses, when out of condition, are liable to sweat more freely than other times, and by this sign are derangements of the system often detected.

When a horse is able to go fast when called upon, there is a greater reason for saving him than if he were a plug, and too slow for either pleasure or profit.

When the development of a horse has to be made in three or four years to make the most of it, there is no portion in that period in which a half-year can be lost.

The horse that has the quality of going very fast, fast enough to win among good ones, will command a high price regardless of the way he goes, and with very little reference to his form.

Usually in the fall is a good time to purchase a stallion. The change feom one place to another, even in the same latitude, has quite an effect upon the condition of a good horse, and by making this change in the fall instead of the spring, quite an advantage is gained.

It never pays to work a weak horse beside a strong one.

Change the feed of a horse sufficiently often to have them relish it.

It never pays to work a slow, lazy horse beside a quick, spirited animal

If breeding light horses, breed for speed; if breeding heavy horses breed for strength.

Cool a heated horse gradually. It is not in the heating up that the danger lies, but in the cooling off.

A moderately quick walk, either under a load or empty, exhausts the animal less than a snail's pace.

Teach the colts to walk well, and a good foundation is laid for all of the other gaits.

A little patience in teaching the horses to be gentle and obedient will often add dollars to their value.

It is the steady gaited horse that covers the greatest number of miles in a day, and does it with the least injury to himself.

A colt wants to be kept eating, and growing and exercising, and anything except fattening as long as he has a time assigned him by nature to grow.

In training the colt to harness, it should not be worked by the side of the sluggard or worn-out horse, but should be hitched by the side of a steady horse that is quick and active, but unexcitable.

Avoid too heavy shoes when shoeing young horses. It tends to make them awkward, and is an unnecessary burden for them to bear.

If colts are handled rightly from the time they are foaled, there will be no trouble in picking up their feet and working them as long as it is necessary to put on shoes.

What is meant by a systematic feeding is simply knowing how much each horse requires per day, how much grain and how much rough food, and what proportion to give each horse, and at what intervals.

A colt once stunted never fully recovers from the effects. It is quite necessary then that the colts be kept growing steadily, even if it requires special care and attention.

MANURES.

The most valuable of all animal manure is poultry droppings. It is most useful just where it is most needed—the vegetable garden. The poultry could produce value to the extent of many thousand pounds of manure if it were all saved. With fresh earth put beneath the roosts every day, five minutes is enough time to clean the place up every morning, the manure being put in a barrel under cover till the barrel is nearly full. Then it can be taken out and applied in the garden. This manure has a wonderful effect on fruit trees. We have known trees which appeared to be dying fast, having apparently struck marl or rock, made to resume a flourishing appearance and keep it, through a good application of fowl manure dug in a little trench all around the roots five or six feet out. At any rate, the effect of this manure has lasted three years, and the trees are now large and heavy bearers.

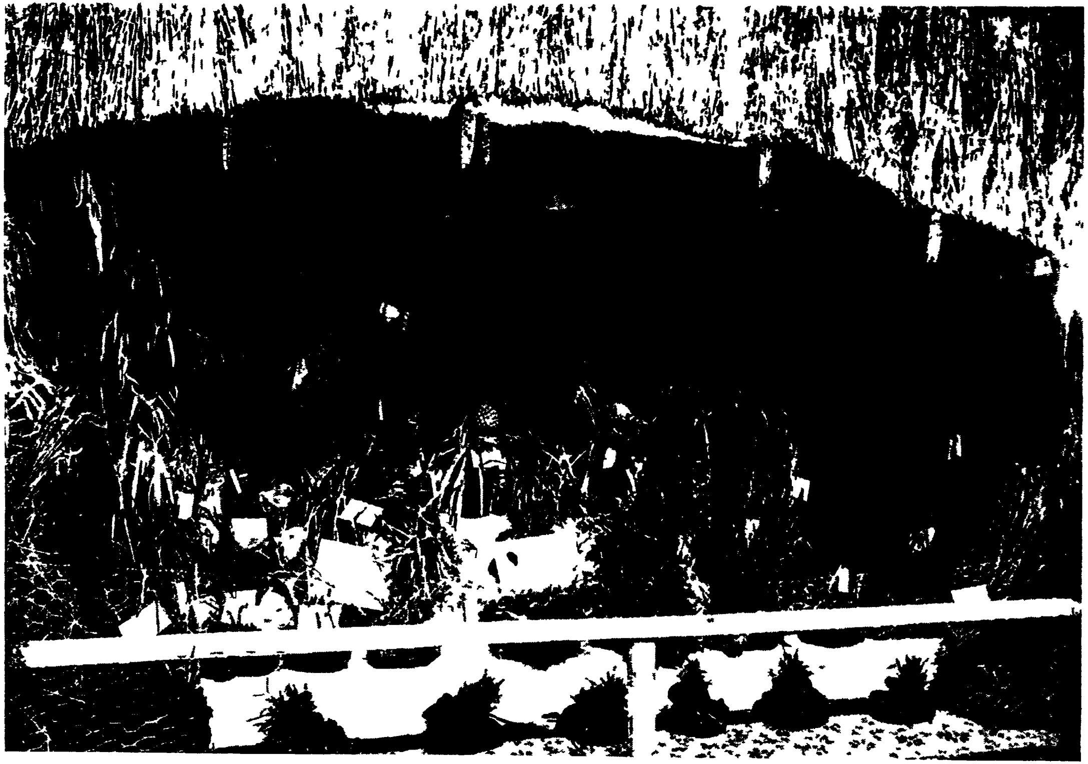
Another valuable manure that is wasted is wood ashes from the fire. This also should be carefully taken out and kept in a barrel and spread round fruit trees. It is often misused by being heaped round the trunks of the trees, but manure should never be used in such a way; the neck of the tree is the most vital spot and should always be kept standing clear and exposed, the manure being spread around beneath the branches or dug in. At the same time a circle of woodashes placed a little bit from the tree, say a foot, will help to keep off ants and slugs. If people who have not got lime at hand to wash trees would use woodashes, they would find this as good; indeed we think better, because of the caustic effects of the potash in the woodashes, as well as the lime.

We often see cows standing in pens where they are kept over night for milking, with several inches of fresh manure and several inches more of old crumbly stuff below, all being wasted. These pens should be scraped out once a week, and the manure used on fruit trees or in the garden.

It is the same with horse manure, large quantities of it are wasted which would be of great value to cultivated crops. Next to the fowl manure, the richest manure is sheep and goat dung. On some pens these are very carefully saved and sold to sugar estates and form quite an item of income.

The man to whom manure is most valuable is the small settler, and he it is who is most careless and uneconomic in the conservation of the droppings of the animals he keeps. Wherever a horse or mule or cow or donkey or goat or pig is penned, there should be dried grass flung in, not only to form comfortable bedding, but to catch the urine which is the most valuable form of excretion, and is generally entirely wasted—and worse than wasted, for it soaks into the earth and makes it foul, so that it may be the cause of disease. There is no soil too rich for our staple crops like bananas, cocoa and coffee; these trees always can take manure and plenty of it. The more they get the better they bear.

COURT OF THE DEPARTMENT OF AGRICULTURE AT THE CHAMBER OF MANUFACTURES EXHIBITION, 1906



Collection of Grasses from State Farm, Hamel

THE VALUE OF POULTRY MANURE.

We have often called attention to the great value of poultry manure as an aid to the market grower. In the *Journal of Agriculture* of Victoria, Mr. H. V. Hawkins, who is a poultry expert, gives an interesting and instructive account of some experiments he has conducted which goes to prove our contention After stating that poultry manure was neglected by the grower, he goes on to give the result of his careful experiments, and remarks that: "When it is remembered that each bird of 8lb. to 9lb. live weight drops nearly 52lb. of manure each year at night time alone, and averages daily droppings of nearly 100lb per bird per year, what must the value of this manure wasted or trodden in yearly be?" To get a fairly accurate idea of its value he had gathered daily the droppings from four pens, the size of each pen being 75ft by 25ft In two of the pens there were eight birds—Dorkings weighing 8lb. each—and in the other two seven The manure was gathered and partly dried for seven days, the weight of manure from each bird then averaging during the daytime 1½oz, and on a dropping board fitted under each perch at night time 2oz. (or equal to 46lb. per annum).

According to a recognised authority, the true market value of this manure is as follows —

	Fresh	Partially Dried
Moisture	61 63	41 06
*Organic matter and ammonia salts	20 19	38 19
Tri basic phosphate of lime	2 97	5 13
Magnesia and alkaline salts, etc	2 63	3 13
Insoluble siliceous matter	12 58	12 49
	100 00	100 00
*Containing nitrogen	1 71	3 78
and equal to ammonia	2 09	4 58

Roughly speaking, the fresh manure is worth £2 per ton, and when dry £4.

Thus the value of poultry is fully demonstrated Lime or woodashes must on no account be used in the runs or houses, as lime liberates the ammonia, and then its value is practically gone We have often urged that poultry houses should be strewed down with burnt earth, as, next to charcoal, the material is the best fixer of the nitrogen No manure can beat that of poultry for tomato growing where used in moderate quantity, especially on light soils.—*The Fruitgrower*, London

A MARE OR A FILLY.

We have been asked on many occasions (says the *Farmer and Stockbreeder*) to express an opinion in the settlement of disputes on a very simple question which frequently occurs in the farmer's experience. When does a mare cease to become a filly? When does a heifer become a cow? The sheep breeder and the pig breeder are not troubled with indistinct definitions of a like character A ram lamb becomes a shearling, a shearling a two shear, a ewe lamb becomes a hogget or a she hogg, and eventually, on maturity, a ewe according to the operation of time, if not irrespective of breeding condition. Similarly, the terms used descriptive of pigs are largely determined by age. Gilts, in-pig gilts, and sows are known according to age, but in the case of horses and cattle the difficulty of determining whether age should be the arbiter in the use of the descriptive terms has long been a matter of contention Most agricultural societies realise this, and the conditions are generally so prepared that the age limit is binding. As a matter of fact, in England the use of the word "mare" and the word "bullock" is very loose In ordinary farm experience a heifer ceases to be a heifer when she has passed the age of three years.

Many people, of course, hold that having had a calf, a heifer becomes a cow, and, similarly, a filly a mare This point was raised in a case lately at Arbroath, where Sheriff Lee was asked to give judgment. A Clydesdale breeder had entered a three-year-old filly, but the Angus Agricultural Association arbitrarily refused to accept the entry because the mare had a foal, arguing that she was a brood mare and not a filly. The breeder took the case before the Court, and the Court decided against him, holding that the society was entitled to make its own regulations, and need not necessarily fall into line with the regulations governing other societies' entries. It was pointed out in the judgment issued by Sheriff Lee that the Highland and Agricultural Society only barred three-year-olds suckling foals from exhibition in the filly class of that age. The regulations were perfectly clear, because they insisted upon "yeld" fillies being shown. This is, of course, merely a quibble, but it gets the society out of a difficulty, for there is nothing to prevent a three-year-old with a foal at foot being shown, not only in the three-year old class, but also in the brood-mare class, and no doubt the Society's object is to prevent a dual entry. At the same time it is rather hard on the breeder, because the only class in which he can enter is the brood mare class, where an immature three-year-old with a foal at foot would naturally suffer when compared with mares of more mature age and development The difficulty might be got over more satisfactorily by allowing the breeder a choice of classes. If he takes an early foal from his fillies, it is very obvious that they will suffer in stature and development, and when classed with other fillies which have not been put to stud so early he is at sufficient disadvantage to incur no further penalty.

While the case technically has gone against the breeder who raised the action, it emphasises the necessity for a clear definition of the rules governing entry at agricultural shows. At many shows, of course, a double entry can be made with a three-year-old brood mare, both in the filly and the brood mare class, but that is not always desirable, and if societies were to permit the breeder to make his choice as to which class he would enter an animal in, there is no reason why anyone should complain. Broadly speaking, the best principle to adopt is the limit of age, and it may be suggested that whichever principle is found to work most satisfactorily should be binding on all societies. This is one of the questions which an association of show secretaries might very well discuss. Varied interpretations of animal nomenclature cannot be satisfactory, either to the exhibitor or to the society, and on this, as on many other points, there should be harmony. It seems to us to still further advance the argument in favour of cohesion amongst agricultural societies, which can only be effected by the means we have on former occasions suggested. The time is now ripe for such an association to be formed on the initiative of the executive of the Royal Agricultural Society.

BEE-KEEPING.

The world is full of men and women who seem to have erred in the choice of their vocations, but the lower animals seldom make such mistakes. Occasionally, however, that happens, and as bees are claimed by some to most nearly approach mankind in their intelligence, it is quite natural to expect them to be qually prone to error. And while that is not quite the case, yet they do sometimes fail to do that which they ought to do and do things which they ought not to do. And, as it is to be expected, error is most common in that sex through which sin first came into the world. The business of the great mass of the female bees is to gather honey, but occasionally they fall from their high duty of working that others may eat and fall to laying eggs—which, although laudable in a pullet is grossly improper in a bee hive in which one lady bee has been chosen and trained to perform the duties of motherhood for the entire colony. T. G. Hermon, writing in an exchange, tells how to get rid of these bees with mistaken ideals:

The question, "What shall I do with a colony of bees having laying workers," is one often found in the farm papers The questioner is sometimes told to break up the colony by distributing its combs among other colonies; sometimes he is told to introduce a fertile queen, and again he is told to carry the colony away to a distance from its old stand and shake all the bees off the combs—this in the hope and expectation that the laying worker or workers will get lost in the operation. There are two easy and sure ways of disposing of laying worker colonies, so as to get all the service out of the bees that they are capable of rendering, and at the same time keep the number of your colonies up to what it was before.

The first way is to place the hive having the laying worker over a strong colony with a fertile queen, placing a newspaper with a small hole in it between the two hives The bees will unite peaceably, and when considerable worker brood appears in the upper hive, the other hive can be placed on a separate stand, and the bees will rear a queen from the brood if you leave the old queen in the lower hive; or you can introduce a fertile queen after about three or four days from the time of their removal.

The other plan contemplates taking off a couple of frames of hatching brood from some of your strong hives, and placing them in another hive over a strong colony, with a frame having wire cloth nailed to both sides of it between the two hives Then release a fertile queen and her escorts on these two combs, and in a few days you will have a nucleus strong enough to take care of your young queen Then set this hive with the nucleus down by the side of the hive containing your laying workers. Then every two or three days transfer a frame with its bees from the laying worker hive to the hive containing the nucleus By the time that all but two of the frames are placed in the new hive, your queen is doing business there, and all is harmony within,

I will add, too, in this connection, that a laying worker colony, if strong, can at the proper season of the year be utilized for the building up of two or three new colonies just as well as for the building of one Keeping brood warm is about all these laying worker bees are good for, anyhow. By taking a couple of frames of hatching brood and treating as I have mentioned, you have an absolutely safe way of introducing any queen, no matter what may be her value These laying worker bees, if discovered at the right season, instead of being a nuisance may be turned to good account, as an aid in the improvement of our stock. All beekeepers know that the bees of a queenless colony are quite liable to be irritable while being handled, are greatly inclined to follow the operator about the apiary and annoy him. If the beekeeper desires a peaceful apiary let him avoid queenless colonies. This, of course, must be done by supplying all queenless colonies with queens as soon as they are discovered to be queenless.

Now about introducing queens; there are several ways in which this can be done successfully Introducing queens with tobacco smoke has been a great success with some. Just at dusk load up the smoker and get it going good, then put in about a pipeful of tobacco, give three or four puffs at the entrance, then take off the cover of the hive and drive down the bees with smoke, then we allow the queen to run down between the combs, following with a few more puffs of smoke. Of course, a good smoker is an indispensable article to every beekeeper. Bees can be smoked too much, particularly when queens are to be introduced or when searching for them. Just how much to give depends upon the disposition of the insects.—*Exchange.*

Courtesy of the Department of Agriculture at the Chamber of Manufactures Exhibition 1900

Miscellaneous Exhibit

GARDEN NOTES FOR FEBRUARY.

By Percy G. Wicken.

February is about the hottest month in the year, and, owing to the length of time we have been without rain, the ground is so dry that there are very few vegetables growing in the garden. The principal operations for the month should consist in keeping the ground well stirred between the growing plants so as to conserve as much moisture as possible for the use of the plant, and in preparing land ready for planting as soon as the first rain falls. All land for garden purposes should be dug as deeply as possible, but the sour subsoil need not be brought to the surface, it should only be broken up and left beneath the surface. It will then gradually sweeten owing to the action of the air and water, and will allow the roots of the plant to penetrate deeply into the soil and thereby enable them to withstand a period of drought. When the soil is broken up it should be well mixed with well-rotted stable manure, or, if this is not obtainable, bone-dust may be used instead, and should be well mixed with the soil. The more soluble fertilisers should be sown at the time of planting the seed, or as a top dressing when the plants have made some growth.

No plant should be allowed to run to seed unless the seed is required for use or sale. The process of forming seed takes a quantity of the fertilising ingredients out of the soil, besides which, if the seeds are allowed to ripen and get scattered all over the ground, they come up next year among another crop and have to be hoed out. As soon as a plant is of no further use it should be cut down and thrown on the compost heap or dug into the ground.

In favourable situations, where water is obtainable in sufficient quantities to permit of watering the vegetable garden, full use should be made of this opportunity, as it is at this season of the year that vegetables are scarce and consequently generally command good prices.

The noxious weed, stinkwort, will become conspicuous this month owing to its green appearance when everything else is dried up This weed, unless kept in check, is likely to become a serious trouble to settlers, and should be destroyed wherever it can be found before it has an opportunity of maturing its seeds.

Beans.—Wherever there is sufficient moisture to germinate the seed, further sowings may be made so as to keep up a supply.

Beans (Madagascar).—The vines should be now well loaded with beans. They should be picked as young as possible, before they become stringy.

Beans (Lima).—Should now be in full bearing. Shell and cook the same as green peas, and if you have more than enough for present requirements dry them and keep them until the winter.

Beet (Red.)—A supply of seed may be sown if they can be watered. Beets require a rich, well-drained soil, and for preference one that has been manured for the previous crop. They should be sown in drills, 18 inches apart, and thinned out to about nine inches apart in the drill, or they can be raised in seed beds and planted out with the first rain.

Beet (Silver).—Sow a little seed in a seed-box so as to have forward plants for the first rain.

Brussel Sprouts.—These miniature cabbages should be more largely grown; they will do well in all the cooler districts. Sow a little seed in a bed ready to plant out later on.

Cabbage.—Sow seed either in a seed-bed or boxes so as to have a supply of plants to put out as early in the season as possible. The soil for the seed-boxes should consist of about half fine soil and half well-rotted stable manure, well mixed together and put through a sieve if possible before sowing the seed. As the young plants come up they should be thinned out so as to allow about a square inch to each plant, and then good healthy plants are obtained.

Carrots.—Prepare land by digging as deep as practicable and working it up fine. Land manured the previous season is preferable to using fresh manure. Carrot seeds germinate slowly, and the rows or seed-beds must be kept free from weeds.

Cauliflower—Prepare seed-beds same as for cabbages, and sow a quantity of seed so as to obtain early seedlings for transplanting.

Melons and Pumpkins.—Select some of the best of each kind to keep for seed, mark them, and allow them to become thoroughly ripe before cutting.

Sweet Potatoes.—Some of the early sown ones should be fit for digging. Keep the others free from weeds and the ground well stirred.

Potatoes.—Prepare land by ploughing deeply, and give it a good dressing of manure so as to be ready to sow as soon as the ground becomes moist enough.

Tomatoes have been very plentiful this season, but contain a great deal of disease. All diseased fruit should be destroyed either by boiling or burning, so as to prevent the spread of the disease.

Turnips--In localities where there is sufficient moisture in the soil both white and Swede turnips may be sown so as to obtain an early crop. In drier districts a few plants may be raised in a seed-box to transplant on the first opportunity.

Farm.—Harvesting operations now being completed, the principal work on the farm will be chaff-cutting and winnowing. The practice of cutting the string bands up with the chaff—which was prevalent some time ago—has been largely discontinued, but a small quantity of chaff with the string cut up still comes into the market. Settlers should discontinue this practice; it does not pay; the chaff commands a lower price, as it is injurious to the horses consuming it. It is very little trouble to cut the bands off when feeding the chaff cutter, and the string is always useful on the farm.

Where the ground is soft enough ploughing operations should be commenced as soon as possible, as the sowing season is so short, but unless the ploughs can do good work and plough an even depth it will be better to leave it over until the rain softens the ground. When land is scratched over and ploughed one inch deep in some places and three or four in others the crop cannot give satisfactory returns. Half the area sown and worked thoroughly will pay better than the larger area badly worked.

Firebreaks should be ploughed wherever possible so as to check any fires which may break out. Although a few plough furrows round a grass paddock may not altogether check a bush fire, they are a great help to those who are attempting to beat out the flames, and often enable them to check the flames when they would not be otherwise enabled to do so.

NOTES ON THE CLIMATE FOR THE MONTH OF DECEMBER, 1906.

The month was the hottest December experienced in Perth since the Observatory was founded. The very exceptional heat was mainly confined to the South-West districts, but it was above the average generally South of the Tropics. On the other hand it was exceptionally cool in the Kimberley District, in fact the coolest December yet recorded there. It has also been one of the earliest and most severe wet seasons in that district. Rain was recorded nearly every day from the 12th till the end of the month, being very heavy at times, with low barometer and weather of the nature of a "willy willy."

Several disturbances were traceable from the N.W. coast across the interior to South Australia; and one could be followed the whole way from Wyhdham round the coast to Cape Leeuwin. This was at the end of last, and commencement of the present month; concurrently with its passage a "high" gradually moved across the Southern portions of the State from West to East. Very heavy rain accompanied it in the far North, and it was preceded by great heat in Western districts as it came down the Indian Ocean towards Cape Leeuwin. It passed Perth on the 4th, and was followed by a cool change.

South of the Tropics the rainfall was light and generally below the average for previous years, except in the extreme South where it was about, and in some cases slightly above, the normal. Pressure was slightly below normal throughout.

W. E. COOKE,
Government Astronomer.

The Observatory, Perth 8th January, 1907.

The Climate of Western Australia during December, 1906.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						December, 1906.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
North-West and North Coast:	Wyndham ...	29·762	29·804	29·898	29·646	93·8	78·7	86·2	106·0	70·0	98·5	81·1	109·6	68·0	1001	16	2834
	Derby ...	29·782	29·808	29·990	29·524	92·7	77·2	85·0	105·0	72·6	97·7	78·8	114·0	70·0	2082	19	3243
	Broome ...	29·750	29·820	29·949	29·556	90·9	78·7	84·8	96·8	70·5	93·5	79·0	108·9	69·3	1155	13	2171
	Condon ...	29·748	29·803	29·946	29·582	93·4	76·4	84·9	104·0	67·2	94·3	74·3	115·0	60·0	14	3	692
	Cossack ...	29·765	29·805	29·950	29·560	98·0	78·0	88·0	112·0	70·0	98·3	76·1	112·9	65·8	7	1	1020
	Onslow ...	29·790	29·808	29·970	29·678	93·9	72·2	83·0	105·0	63·8	98·0	70·3	115·0	54·5	2	1	654
	Winning Pool ...	29·768	...	29·977	29·604	103·0	72·1	87·6	108·0	66·0	..		.	...	*Nil*	...	955
	Carnarvon ...	29·854	29·876	29·995	29·670	86·2	70·9	78·6	104·2	65·2	85·0	68·7	110·5	53·2	*Nil*	...	750
	Hamelin Pool...	29·848	29·870	29·990	29·649	95·0	68·2	81·6	107·6	61·0	95·0	64·5	111·8	53·2	7	2	580
	Geraldton ...	29·883	29·938	29·021	29·680	84·8	64·7	74·8	106·6	56·6	80·9	61·3	110·0	49·8	*Nil*	...	2041
Inland:	Hall's Creek ...	29·790	29·811	29·940	29·596	95·2	74·4	84·8	107·0	68·0	100·6	75·8	110·2	60·0	968	16	1652
	Marble Bar ...	...	...	...	...	105·3	78·5	91·9	112·5	72·0	106·5	76·5	118·8	65·2	113	13	1098
	Nullagine ...	29·738	29·767	29·927	29·533	103·4	75·6	89·5	112·4	69·0	104·2	73·4	113·4	58·5	218	4	1148
	Peak Hill ...	29·740	29·784	29·960	29·520	101·0	77·0	89·0	108·0	68·0	99·2	72·9	109·7	54·3	16	1	955
	Wiluna ...	29·754	29·761	30·015	29·532	98·6	73·2	85·9	106·8	62·0	97·5	69·5	110·1	53·9	50	3	775
	Cue	29·791	29·826	30·000	29·575	99·6	70·5	85·0	107·0	62·0	98·6	69·3	112·0	50·5	131	3	1060
	Murgoo ...	...	...	.	.	99·2	70·9	85·0	106·5	61·0	..	...	...	...	10	2	782
	Yalgoo ...	29·813	29·848	30·017	29·619	97·2	68·2	82·7	105·1	60·1	96·5	65·2	113·5	49·8	5	1	1029
	Nungarra ...	...	...	...	...	..	...	..	..	..	...	...	..	...	...	...	...
	Lawlers ...	29·800	29·880	30·120	29·566	96·5	71·5	84·0	104·9	63·0	96·2	70·0	110·4	52·3	9	2	727
	Laverton ...	29·843	29·846	30·197	29·563	95·9	68·5	82·2	108·8	54·8	94·8	67·0	110·0	50·3	147	1	915
	Menzies ...	29·883	29·858	30·216	29·664	94·2	67·3	80·8	103·0	55·5	93·4	65·7	110·9	49·2	14	2	574
	Kanowna* ...	...	...	...	...	92·6	63·5	78·0	105·0	52·0	90·1	62·0	108·1	48·5	15	2	991
	Kalgoorlie ...	29·878	29·876	30·257	29·590	92·9	63·8	78·4	106·4	52·0	91·4	62·6	110·0	47·9	27	3	905
	Coolgardie ...	29·885	29·891	30·267	29·590	91·8	62·6	77·2	105·8	51·0	91·2	61·0	110·2	47·6	25	3	969
	Southern Cross	29·900	29·882	30·200	29·630	95·0	62·0	78·5	104·0	52·0	92·6	60·5	113·0	46·9	50	3	962
	Kellerberrin ...	...	...	...	...	...	..	..	..	...	...	...	...	...	13	2	1076
	Walebing ...	...	...	...	...	92·8	60·7	76·8	104·2	49·0	87·2	58·2	107·7	44·0	20	2	2060
	Northam ...	...	...	...	...	93·7	61·2	77·4	106·0	54·0	89·4	59·4	109·1	44·1	10	1	1755
	York ...	29·922	29·938	30·188	29·662	93·1	60·8	77·0	105·5	52·2	80·2	58·2	114·5	44·6	7	2	1442
	Guildford ...	...	...	...	...	89·7	61·8	75·8	103·5	50·4	84·5	58·8	109·4	42·0	9	1	3012

The Climate of Western Australia during December, 1906—*continued.*

Locality.	Barometer (corrected and reduced to sea-level). Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month	Shade Temperatures. December, 1906. Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Average for previous Years. Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Rainfall. Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
South-West and South Coast:																
Perth Gardens	29·912	29·960	30·125	29·637	87·0	64·0	75·5	102·8	54·6	83·1	60·7	107·0	46·0	*Nil*	...	3151
Perth Observatory ...	29·927	29·970	30·136	29·680	84·8	63·4	74·1	101·7	54·9	80·3	60·5	107·9	49·2	4	1	3237
Fremantle	29·950	29·978	30·170	29·720	81·1	64·7	72·9	100·0	55·5	76·8	61·9	104·0	51·5	13	2	2483
Rottnest	29·947	29·960	30·145	29·715	77·6	63·6	70·6	98·0	57·2	74·8	62·2	102·0	50·7	1	1	2097
Mandurah	...	...	...	...	84·0	61·8	72·9	100·0	52·2	80·8	58·5	99·8	43·6	6	2	4091
Marradong	...	...	...	...	..	...	...	...	...	...	...	...	...	16	1	2641
Wandering	...	...	...	...	88·3	53·6	71·0	102·5	44·1	83·4	51·3	104·2	36·8	22	1	2408
Narrogin	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...
Collie	...	...	...	...	86·7	53·6	70·2	100·2	44·0	81·0	51·6	100·2	39·5	28	4	3749
Donnybrook	...	...	...	..	85·6	55·6	70·6	99·7	42·3	80·8	53·6	100·7	39·3	35	3	3942
Bunbury	29·956	29·992	30·196	29·712	82·3	59·3	70·8	92·8	50·2	78·3	56·3	101·5	44·4	32	4	3138
Busselton	...	...	...	...	82·5	56·5	69·5	94·9	47·2	78·6	53·2	93·8	40·2	1	1	3331
Cape Naturaliste ...	29·956	.	30·203	29·682	75·0	59·0	67·0	84·0	50·0	...	...	...	...	6	2	3121
Bridgetown	...	...	...	...	85·1	51·7	68·4	100·0	42·0	80·3	49·6	100·2	36·0	39	4	3400
Karridale	29·975	30·001	30·200	29·620	77·0	56·0	66·5	93·0	47·0	73·9	54·6	101·0	41·3	93	6	3937
Cape Leeuwin	29·960	29·981	30·200	29·600	74·0	64·0	69·0	80·0	55·0	71·6	60·1	98·4	53·0	118	10	3434
Katanning	29·940	29·992	30·240	29·650	87·4	54·7	71·0	103·3	46·0	83·9	53·2	105·8	41·0	93	2	1936
Mt. Barker	...	...	...	...	78·1	53·9	66·0	98·8	44·8	...	...	...	...	98	8	2633
Albany	29·998	29·997	30·304	29·749	73·3	56·9	65·1	86·0	50·0	71·6	54·9	103·0	41·2	159	3	3850
Breaksea...	29·995	29·996	30·310	29·720	65·0	59·0	62·0	79·0	55·0	68·1	57·4	94·0	46·0	225	14	3416
Esperance	29·966	29·986	30·306	29·659	79·7	58·7	69·2	106·0	49·5	76·4	57·1	108·0	40·8	25	4	2432
Balladonia	29·970	29·960	30·348	29·675	86·6	57·5	72·0	104·2	40·9	84·9	54·6	108·8	42·5	56	2	857
Eyre	29·952	29·980	30·311	29·674	78·6	59·9	69·2	112·3	40·2	77·4	57·0	112·2	37·2	8	3	1009
INTERSTATE.																
Perth	29·927	29·970	30·136	29·749	84·8	63·4	74·1	101·7	54·9	80·3	60·5	107·9	49·2	4	1	3237
Adelaide	30·006	29·946	30·364	29·620	83·9	59·6	71·8	108·7	43·0	83·7	59·1	114·2	43·0	154	5	2641
Melbourne	...	29·820	...	..			..	.	...	75·4	53·9	110·7	40·0	...	...	...
Sydney	30·030	29·918	30·300	29·630	77·0	62·0	70·0	90·0	55·0	77·1	62·8	107·5	49·3	218	7	3246

The Observatory, Perth, 8th January, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for November, 1906 (completed as far as possible), and for December 1906 (principally from Telegraphic Reports).

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham ...	367	4	1001	16
6-Mile	...	...	...	...
Carlton	...	...	...	...
Ivanhoe	...	...	...	...
Argyle Downs ...	...	...	...	...
Rosewood Downs	...	...	...	...
Lisadell	...	...	...	...
Turkey Creek ...	203	5	1247	16
Ord River ...	...	...	...	...
Alice Downs ...	...	...	...	...
Flora Valley ...	...	...	...	...
Hall's Creek ...	6	1	968	16
Nicholson Plains	...	...		...
Ruby Plains ...	...	...	...	...
Denison Downs	...	...	...	...
WEST KIMBERLEY:				
Mt. Barnett ...	...	...	...	...
Corvendine ...	...	...	...	...
Leopold Downs...	...	...	...	...
Fitzroy Crossing (P.O.)	20	2	635	12
Fitzroy Station ..	...	...	...	...
Brooking ...	...	...	...	...
Cherrabun ...	...	...	...	...
Bohemia Downs	...	...	...	...
Quanbun ...	...	...	...	...
Nookanbah ...	...	...	...	...
Upper Liveringa	...	...	...	...
Yeeda	...	...	...	...
Derby	12	1	2082	19
Pt. Torment ...	...	...	...	...
Obagama ...	27	1	...	...
Beagle Bay ...	...	...	...	...
Roebuck Downs	Nil	...	...	...
Kimberley Downs	...	...	...	...
Broome	Nil	...	1155	13
Thangoo ...	...	...	...	...
La Grange Bay...	Nil	...	1260	9
N.W. COAST:				
Wallal	Nil	...	186	7
Pardoo	Nil	...	...	...
Condon	Nil	...	14	3
DeGrey River ...	...	...	...	...
Port Hedland ...	Nil	...	33	2
Boodarie ...	Nil	...	...	...
N.W. COAST—*contd.*				
Balla Balla ...	...	...	...	...
Whim Creek ...	Nil	...	19	3
Mallina	...	...	...	...
Croydon	Nil	...	...	...
Sherlock... ...	...	...	...	...
Woodbrooke ...	Nil	...	...	...
Cooyapooya ...	Nil	...	...	...
Roebourne ...	Nil	...	Nil	...
Cossack	Nil	...	7	1
Fortescue ...	Nil	...	30	2
Mardie	Nil	...	...	...
Chinginarra ...	Nil	...	...	...
Yarraloola ..	...	...	...	...
Peedamullah ...	...	...	...	...
Onslow	Nil	...	2	1
Point Cloates ...	...	...	...	...
N.W. INLAND:				
Warrawagine ...	Nil	...	...	...
Eel Creek ...	...	...	...	...
Muccan	...	...	...	...
Ettrick	Nil	...	...	...
Strelly	...	...	...	...
Mulgie	Nil	...	...	...
Warralong ...	Nil	...	...	...
Coongon ...	122	2	...	...
Talga	...	...	...	...
Bamboo Creek ...	2	1	102	5
Moolyella ...	...	...	...	...
Marble Bar ...	7	2	113	13
Warrawoona ...	Nil	...	94	6
Corunna Downs	12	1	...	...
Mt. Edgar ...	...	...	...	...
Nullagine ...	Nil	...	218	4
Middle Creek ...	Nil	...	...	...
Mosquito Creek	...	...	...	...
Roy Hill ...	...	...	...	...
Bamboo Springs	6	1	...	...
Kerdiadary ...	Nil	...	...	...
Woodstock ...	Nil	...	...	...
Yandyarra ...	...	...	...	...
Station Peak ...	...	...	...	...
Mulga Downs ...	Nil	...	...	...
Mt. Florence ...	Nil	...	...	...
Tambrey ...	Nil	...	...	...
Millstream ...	Nil	...	...	...

RAINFALL—*continued.*

Stations.	November.		December.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. INLAND—*contd.*				
Red Hill	Nil	...	...	...
Mt. Stewart	...	...	...	...
Peake Station	Nil	...	...	...
Nanutarra	Nil	...	...	...
Yanrey	Nil	...	...	...
Wogoola	...	...	...	...
Towera	5	1	...	...
GASCOYNE:				
Winning Pool	7	1	Nil	
Coordalia	Nil	...	...	...
Wandagee	...	...	...	...
Williambury	14	1	...	...
Yanyeareddy	Nil	...	...	...
Maroonah	...	...	...	...
Ullawarra	...	...	...	...
Mt. Mortimer	...	...	...	...
Edmunds	9	1	...	...
Gifford Creek	...	...	...	...
Bangemall	Nil	...	...	...
Mt. Augustus	...	...	...	...
Upper Clifton Downs	4	1	...	...
Clifton Downs	...	...	...	...
Dairy Creek	Nil	...	...	...
Mearerbundie	...	...	..	...
Byro	...	...	...	...
Meedo	Nil	...	...	...
Mungarra	...	...	...	...
Bintholya	...	...	...	...
Lyon's River	...	...	15	1
Mangaroon	Nil	...	...	...
Booloogooroo	...	...	...	...
Doorawarrah	Nil	...	...	...
Brick House	...	...	...	...
Boolathana	...	...	...	...
Carnarvon	92	13	Nil	...
Point Charles	...	...	Nil	...
Dirk Hartog	...	...	...	...
Sharks Bay	14	1	Nil	...
Wooramel	13	2	26	1
Hamelin Pool	8	1	7	2
Kararang	11	1	...	...
Tamala	...	...	...	...
YALGOO DISTRICT:				
Woolgorong	45	1	...	...
New Forest	...	...	...	...
Yuin	...	...	...	...

Stations.	November.		December.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
YALGOO DISTRICT—*contd.*				
Pindathuna	Nil	..	10	1
Tallyrang	...	...	...	...
Mullewa	Nil	...	14	1
Kockatea	21	1	Nil	...
Barnong	Nil	...	Nil	...
Gullewa	Nil	...	Nil	...
Gullewa House	..	...	...	...
Gabyon	Nil	...	4	2
Mellenbye	63	1	6	1
Wearagaminda	40	1	10	3
Yalgoo	42	2	5	1
Wagga Wagga	29	2	31	2
Muralgarra	29	2	...	...
Burnerbinmah	35	3	...	...
Nalbara	34	2	...	...
Wydgee	...	...	88	2
Field's Find	30	2	31	3
Thundelarra	42	2	...	...
Rothesay	66	2	...	...
Ninghan	32	2	...	...
Condingnow	30	1	82	5
163-Mile	7	1	136	2
Palaga Rocks	...	...	...	...
126-Mile	60	1	43	4
90-Mile	54	2	33	2
Mt. Jackson	64	3	...	...
MURCHISON:				
Wale	28	2	..	...
Yallalonga	...	...	...	..
Billabalong	...	...	...	...
Twin Peaks	44	2	...	...
Murgoo	38	1	...	...
Mt. Wittenoom	45	2	...	...
Meka	49	1	...	...
Wooleane	44	1	...	...
Boolardy	...	...	...	...
Yederah	...	...	...	...
Woogorong	50	1	...	...
Manfred	27	1	...	...
Yarra Yarra	58	1	...	...
Milly Milly	32	1	...	...
Berringarra	16	1	...	...
Miloura	Nil		...	...
Mt. Gould	...	...	...	...
Moorarie	Nil	...	...	...
Wandary	...	...	...	...
Peak Hill	8	1	16	1
Abbotts	Nil	...	9	2
Belele	...	...	...	...

RAINFALL—*continued.*

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
MURCHISON—*contd.*				
Minderoo ...	Nil	...	...	...
Gabanintha ...	Nil	...	63	4
Quinn's	...	...	...	...
Bungalow ...	Nil	...	85	1
Nannine	7	3	28	2
Annean	Nil	...	...	...
Tuckanarra ...	Nil	...	...	...
Coodardy ...	...	...	Nil	...
Cue	4	1	131	3
Day Dawn ...	Nil	...	64	3
Lake Austin ...	36	1	84	2
Lennonville ...	34	3	111	4
Mt. Magnet ...	24	2	82	3
Youeragabbie ...	...	...	92	2
Murrum	Nil	...	Nil	...
Challa	38	2	108	3
Nunngarra ...	...	...	...	...
Berrigrin ...	...	...	112	2
EAST MURCHISON:				
Gum Creek ...	Nil	...	40	2
Dural	Nil	...	...	...
Wiluna	1	1	50	3
Mt. Sir Samuel ...	24	2	73	3
Lawlers	14	1	9	2
Granite Station	17	2	...	...
Wilson's Patch...	...	...	32	1
Poison Creek ...	...	...	...	...
Lake Darlôt ...	17	3	82	3
Darda	Nil	...	41	1
Salt Soak ...	8	1	...	...
Duketon ...	..	...	...	...
NORTH COOLGARDIE GOLDFIELDS:				
Laverton ...	16	3	147	1
Mt. Morgans ...	14	3	Nil	...
Murrin Murrin...	27	3	34	1
Mt. Malcolm ...	23	1	Nil	...
Mt. Leonora ...	38	3	Nil	...
Tampa	26	1	Nil	...
Kookynie ...	30	1	Nil	...
Niagara	55	3	13	...
Yerilla	...	...	...	...
Yundamindera ..	36	4	20	1
Mt. Celia ...	12	1	...	...
Edjudina ...	52	4	...	...
Quandinnie ...	...	...	...	...
Menzies	52	2	14	2
Mulline	35	5	44	4

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH COOLGARDIE GOLDFIELDS—*contd.*				
Mulwarrie ...	24	3	41	2
Goongarrie ...	Nil	...	Nil	...
COOLGARDIE GOLDFIELDS:				
Waverley ...	...	...	...	...
Bardoc	35	2	25	1
Broad Arrow ...	65	4	14	2
Kanowna ...	89	4	15	2
Kurnalpi ...	75	4	Nil	...
Bulong	80	4	56	2
Kalgoorlie ...	84	4	27	3
Coolgardie ...	99	5	25	3
Burbanks ...	74	4	58	3
Bulla Bulling ...	Nil	...	10	1
Woolubar ...	...	...	...	...
Waterdale ...	76	3	37	3
Widgiemooltha...	109	9	19	3
50-Mile	177	6	...	...
Norseman ...	190	9	25	4
Lake View ...	172	7	17	2
Frazer Range ...	...	...	...	...
Southern Hills ...	165	4	...	...
YILGARN GOLDFIELDS:				
129-Mile	66	8	...	...
Emu Rocks ...	11	1	...	...
56-Mile	61	2	88	3
Glenelg Rocks ...	33	2	...	...
Burracoppin ...	60	1	16	1
Bodallin ...	59	2	64	1
Parker's Road ...	49	2	...	...
Southern Cross ...	55	3	50	3
Parker's Range...	97	7	49	5
Yellowdine ...	125	3	50	1
Karalee	140	3	30	1
Koorarawalyee ..	150	4	81	3
Boorabbin ...	113	4	72	2
Boondi	184	4	80	2
SOUTH-WEST (NORTHERN DIVISION):				
Murchison House	6	1	...	...
Mt. View ...	Nil	...	Nil	...
Mumby	7	1	10	2
Northampton ...	12	2	9	1
Chapman Experimental Farm	Nil	...	Nil	
Narra Tarra ...	...	...	...	...

RAINFALL—*continued.*

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (NORTHERN DIVISION)—*contd.*				
Oakabella	Nil	...	...	...
White Peak	...	...	...	...
Geraldton	11	2	Nil	...
Hinton Farm	Nil	...	...	...
Tibradden	2	1	Nil	...
Myaree	6	2	...	...
Sand Springs	...	...	...	...
Nangetty	...	...	...	...
Greenough	14	3	Nil	...
Bokara	16	2	8	1
Dongara	20	2	5	1
Strawberry	14	3	9	1
Yaragadee	...	...	...	...
Urella	...	...	...	...
Opawa	25	4	15	2
Manara	11	1	..	...
Mingenew	30	4	2	1
Yandenooka	...	...	...	...
Arrino	...	...	Nil	..
Carnamah	84	3	9	3
Jun Jun	22	2	...	...
Watheroo	148	3	...	...
Nergaminon	...	...	...	...
Dandaragan	115	4	19	1
Yatheroo	139	4	...	...
Moora	114	3	18	2
Walebing	73	5	20	2
Round Hill	135	2	15	2
New Norcia	120	4	4	1
Wongon Hills	64	2	...	...
Wannamel	53	3	2	1
Gingin	122	2	Nil	...
SOUTH-WEST (METROPOLITAN):				
Wanneroo	37	3	Nil	...
Belvoir	23	3	Nil	...
Wandu	9	4	3	1
Mundaring	Nil	...	5	2
Canning Waterworks	4	2	9	2
Kalbyamba	27	3	9	2
Guildford	18	4	9	1
Perth Gardens	18	3	Nil	...
Perth Observatory	22	4	4	1
Highgate Hill	18	2	14	1
Subiaco	15	3	...	...
Claremont	...	...	..	...
SOUTH-WEST (METROPOLITAN)—*cont.*				
Fremantle	20	3	13	2
Rottnest	5	3	1	1
Rockingham	32	2	Nil	...
Jandakot	7	1	3	1
Armadale	...	...	...	...
Mundijong	50	5	4	1
Jarrahdale	80	4	Nil	...
Jarrahdale (Norie)	95	5	...	...
Serpentine	40	3	9	2
EXTREME SOUTH-WEST:				
Mandurah	112	4	6	2
Pinjarra (Blythewood)	51	4	145	9
Pinjarra	27	2	Nil	...
Upper Murray	32	4	14	4
Yarloop	11	3	15	4
Harvey	16	4	19	3
Brunswick	10	1	21	2
Collie	13	3	28	4
Glen Mervyn	54	6	31	3
Donnybrook	11	3	35	3
Boyanup	5	3	15	4
Bunbury	4	2	37	5
Elgin	24	4	5	2
Busselton	10	3	1	1
Quindalup	33	4	3	1
Cape Naturaliste	17	7	6	2
Glen Lossie	..	.	...	...
Karridale	52	1	93	6
Cape Leeuwin	52	15	118	10
Lower Blackwood	112	8	28	3
Ferndale	44	6	116	2
Greenbushes	26	2	37	4
Cooeearup	..	...	23	3
Bridgetown	45	6	39	4
Hilton	44	1	10	1
Greenfields	27	3	...	..
Duminup	52	3	47	1
Cundinup	...	..	...	...
Wilgarrup	64	10	37	5
Balbarrup	101	8	91	2
Bidellia	...	...	...	...
Westbourne	118	5	72	1
Deeside	89	6	51	1
Riverside	101	7	41	1
Mordalup	...	...	88	2
Lake Muir	120	9	152	5

RAINFALL—*continued.*

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN AGRICULTURAL DISTRICTS:				
Walgo	Nil	...	11	1
Emungin ...	72	3	...	...
Dowerin ...	147	2	6	2
Warramuggin ...	...	...	..	...
Oak Hill ...	...	...	..	...
Monglin	..	..	...	...
Hatherley ...	...	...	...	...
Momberkine ...	...	...	...	...
Bolgart .	43	2	Nil	...
Eumalga .	22	1	Nil	. .
Newcastle ...	21	1	Nil	...
Craiglands ...	5	1	4	1
Eadine	...	..	...	...
Northam ...	28	2	10	1
Grass Valley ...	.		..	..
Cobham	84	3	Nil	
York	53	2	7	2
Burrayocking ..	.210	3	7	2
Meckering .	108	3	Nil	
Cunderdin ...	82	2		.
Doongin ...	56	2	Nil	.
Whitehaven ...		.	..	.
Mt. Caroline ...	71	2	6	1
Cutenning ...	49	2	4	2
Kellerberrin ...	50	2	13	2
Cardonia ...	88	2	. .	...
Baandee ...	Nil		10	1
Nangeenan ...	46	2	34	2
Merredin ...	45	1	31	3
Codg-Codgen ...	141	2	4	2
Noongarin ...	59	2	35	2
Mangowine ...	55	2	24	3
Yarragin ...	62	2	14	2
Wattoning ...	...	...	...	...
Koomberkyne ...	...	...	...	..
GREAT SOUTHERN RAILWAY LINE:				
Dalebridge ...	82	2	...	...
Beverley ...	84	2	...	...
Brookton – ...	69	2	...	...
Sunning Hill ...	93	2	...	...
Pingelly ...	128	2	...	...
Yornaning ...	90	4	...	...
Narrogin ...	36	4	...	...
Rose Hill ...	94	2	70	2
Wagin	39	4	...	...
Katanning ...	103	4	93	2
Sunnyside ...	92	7	110	2
GREAT SOUTHERN RAILWAY LINE—*contd.*				
Broomehill ...	62	4	97	3
Woodyarrup ...	83	5	152	3
Pallinup ...	77	5	123	3
Tambellup ...	49	4	143	3
Toolbrunup ...	37	3	146	3
Cranbrook ...	75	10	90	4
Stirling View ...	98	10	93	3
Kendenup ...	78	8	91	3
Woogenellup ...	68	8	...	...
Wattle Hill ...	119	14	...	...
St. Werburgh's...	126	16	118	8
Mt. Barker ...	165	20	98	8
WEST OF GREAT SOUTHERN RAILWAY LINE:				
Talbot House ..	96	2	Nil	...
Jelcobine ...	6	1	25	2
Bannister ...	18	2	30	2
Wandering ...	84	2	22	1
Glen Ern ..	53	2	53	2
Marradong ...	6	2	16	1
Wonnaminta ...	34	4	70	10
Williams ...	23	1	6	1
Rifle Downs ...	..	...	...	...
Darkan	...	...	...	...
Arthur River ...	82	3	46	4
Gainsborough ...	69	4	...	...
Glenorchy ...	10	1	...	...
Kojonup ...	22	2	20	1
Blackwattle ...	...	...	...	...
Warriup ...	137	13	98	5
Forest Hill ...	166	13	66	5
EAST OF GREAT SOUTHERN RAILWAY LINE:				
Sunset Hills ...	...	...	...	...
Oakdale	160	2	Nil	...
Barrington ...	235	3	...	...
Bally Bally ...	146	2	4	1
Stock Hill ...	28	2	4	1
Qualin	104	2	8	1
Woodgreen ...	40	4	15	3
Glenallan ...	128	4	5	1
Gillimanning ...	93	3	18	1

RAINFALL—*continued.*

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of Points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST OF GREAT SOUTHERN RAILWAY LINE—*contd.*				
Wickepin ...	205	1	36	2
Crooked Pool ...	...	...	70	2
Nallyring ...	55	5	56	2
Bunking ...	62	2	30	1
Bullock Hills ...	163	4	...	...
Dyliabing ...	111	7	86	2
Glencove ...	83	3	33	2
Cherillalup ...	89	7	66	2
Mianelup ...	74	7	...	...
Woolganup ...	46	4	81	2
Chillinup ...	45	2	...	...
Jarramongup ...	...	..	...	...
Uberin	...	...	10	2
SOUTH COAST:				
Wilson's Inlet ...	153	12	82	9
Grasmere ...	108	16	115	13
King River ...	92	8	125	4
Albany	60	14	159	3
Point King ...	40	5	136	7
Breaksea ...	61	19	225	25
Cape Riche ...	139	7	120	3
SOUTH COAST—*contd.*				
Peppermint Grove	164	14	152	7
Bremer Bay ...	177	12	142	8
Coconarup ...	113	9	...	...
Ravensthorpe ...	150	10	88	6
Cowjanup ...	109	...	...	...
Hopetoun ...	198	9	144	6
Fanny's Cove ...	153	5		...
Park Farm ...	201	8	37	4
Grass Patch ...	187	4	Nil	...
Swan Lagoon ...	204	7	...	...
30-Mile	199	8	...	...
Gibson's Soak ...	217	10	...	...
Myrup	175	9	8	1
Esperance ...	180	9	25	4
Boyatup	218	9	21	2
Lynburn ...	257	10	...	...
Cape Arid ...	260	13	...	...
Point Malcolm ...	212	11	...	...
Israelite Bay ...	223	11	5	2
Balbinia	175	8	...	...
Balladonia ...	161	10	56	2
Eyre	148	12	8	3
Mundrabella ...	..	.	...	...
Eucla	200	2	39	2

The Observatory, Perth,
8th January, 1907.

W. E. COOKE,
Government Astronomer.

STUD BULLS.

COPY OF AGREEMENT TO BE SIGNED BEFORE TAKING OVER STUD BULLS.

MEMORANDUM OF AGREEMENT made this... ....day of ....between the Hon. the Minister for Lands, on behalf of the Department of Agriculture, and... ....

The said.., in consideration of being lent the ....bull........... . ... hereby agrees to pay to the Department the sum of £4, and to keep the said bull, free of all cost to the Department of Agriculture, in a secure and separate enclosure from all other stock, and to feed him and keep him in good condition. The bull to be kept for a period of twelve months from date of receipt, unless otherwise agreed upon.

The bull to be at service of any cow in the district, on payment of a fee not to exceed 2s. 6d. (two shillings and sixpence), such fees to be retained by and become the property of the said............................ ....

The bull is not to serve more than two cows in one day, nor more than thirty in one month, and not to serve more than once to a cow at each service.

The name and address of the owner, and the name and brand of each cow, including those belonging to the said..................................... ... . must be properly recorded at the time of service, and a list of such records forwarded to the Department of Agriculture when the bull is delivered up.

In all matters regarding the bull, instructions given by the Director of Agriculture, or other officer authorised by the Minister for Lands, must be carried out at once to his satisfaction, and the Minister reserves the right to remove the bull if satisfied that he is not receiving proper treatment.

The said...also agrees to pay cost of carriage of bull from... to...and to deliver him at the nearest railway station free of charge.

I agree to the above conditions, and herewith forward the sum of Four pounds (£4) as specified above.

Signature,

By Authority: FRED. WM. SIMPSON, Government Printer, Perth.

JOURNAL
OF THE
Department of Agriculture
OF
WESTERN AUSTRALIA.

Vol. XV. FEBRUARY, 1907. Part 2.

EDITOR'S NOTES.

Grass Seed.—Considerable discussion has been taking place in the columns of the daily Press on the question of locally purchased grass seed. Some writers assert that they have to pay too much for it. Our experience is that first-class seed may be obtained from local seedsmen at a much cheaper rate than small parcels can be brought into the State from the other colonies, and quite as cheap even when large parcels are required.

Bee Notes. In a report supplied by Mr. J Sutton, Consulting Bee Expert to the Department of Agriculture, he states there is every indication of a good honey harvest in the Balingup district, the only trouble being from the ravages of the bee-moth, and even this could be overcome by the introduction of pure Italian queens Some of the hybrid colonies were very vicious. A change to pure queens in these cases will soon right matters.

Paspalum.- A correspondent, writing from Boyanup, states:—"That Mr. B. Harrison's report, which appeared in a recent issue of the JOURNAL, contains the very best possible information on the growing and cultivation of paspalum that any farmer could wish for. A sheaf of grass I sent to the late Exhibition was admitted to be the best ever seen, and my advice is that every farmer and dairyman should sow a good area of this at once. It is a gold mine."

Codlin Moth.—The codlin moth outbreak, reported in Perth last year, and both in Perth and at Albany the year before, has not this season been repeated. Mr. T. Hooper, Chief Inspector, reported that, although very careful and continuous searching has been made by himself and also by Mr. Whittington in Perth and Mr. Breen at Albany for traces of the codlin moth, no signs of the pest have up to date been seen. The trees in the affected area are well under control, and it is hoped, therefore, that so far as Western Australia, is concerned the codlin moth has been unable to establish itself. All credit is due to the officers mentioned in carrying out the work of eradication.

Red Mite.—It is really surprising that, notwithstanding the pains taken by the officers of the Agricultural Department to impart a knowledge to settlers of how to do things, we continually hear of people taking outside advice, with the result that they suffer accordingly. As an instance, it has been reported that the only insect pest found in an orchard at Bridgetown was the red-mite. The trees infested were specially treated last winter with a preparation from a formula obtained from an English publication as a certain cure for red-mite, but which proved a failure. It must be remembered that whilst a treatment might be successful elsewhere, here in this State under different climatic conditions it often proves injurious to the tree.

Mystery of Lockjaw Germs.—An extraordinary series of fatalities has been happening on a field abroad. Labourers working therein were suddenly smitten with the death stroke and perished, until it was difficult to get anyone to till the field. Only one man was left, and he had happened to notice that each of the other men had cut themselves, and, albeit ever so little, they nevertheless caught the complaint, and rapidly perished. This man was very careful, therefore, not to cut himself; but at last, in a moment of unwariness, he gashed his foot with a hoe. He bound it up and went at once to a hospital. "Tetanus!" said the surgeon there, and gave him an injection of the anti-toxin. Then his story came out. A rigid investigation of that five-acre field was made, and the ground was found to be unusually laden with the germ of lockjaw, the dread, yet mysterious, disease which had been slaying the labourers who had set foot in the rich, black soil. All soil contains the tetanus germ to some extent, and that is why dirt must not be allowed to enter a cut.

Large Pear Tree.—In a report sent to the Department by Mr. G. Wickens, one of the orchard inspectors, mention is made of an enormous pear tree growing in Mr. W. Brockman's orchard on the Warren. Mr. Wickens states that he personally measured the tree, the dimensions of which were as follows:—Height from ground to topmost branch, 50 feet; width through branches, 47 feet; girth around stem two feet from ground, 6 feet. Eighty cases were taken from the tree last year, besides a very large quantity that went to waste owing to their growing at the end of slender boughs that could not be reached. It is estimated that over 100 cases will be sent to market from this tree this year. It is 39 years old and in splendid condition.

Poultry for Sale at Narrogin Farm.—There are now a number of strong useful birds for sale at the Narrogin Farm especially suitable for improving ordinary mongrel stock, viz., White and Brown Leghorns, Silver Wyandottes, and Plymouth Rock Cockerels; also Indian Runner and Pekin Drakes, Toulouse Geese. All this stock are strong and healthy, and for disposal at moderate prices, chiefly at 10s. to 15s. each, carefully packed and railage paid to any part of the State. A few extra choice specimens, suitable for country shows, 20s. each. There are no pullets for sale this season, as they are all wanted for egg production. No eggs for sitting purposes are for sale at present. This being the off season, all breeding pens are broken up.

Wheat Yield.—The Acting Government Statistician reports that having now received returns from all the land inspectors in the various wheat-growing districts, he is enabled to submit the following forecast of the season's wheat crop for the State:—Total estimated area under wheat for grain, 216,479 acres; total estimated wheat yield, 2,309,354 bushels; estimated average wheat yield per acre, 10·67 bushels. The estimated area to be reaped for grain is, it will be seen, considerably higher than the actual area for the previous season, which was 195,071 acres. As, however, the present season appears to be a less favourable one than that of 1905-6, the total yield promises to be only slightly higher than its predecessor, which amounted to 2,308,305 bushels, whilst the average yield per acre will probably be distinctly lower, last year's average being 11·83 bushels.

Sheep Dip.—Cable advice has just been received that Messrs. Wm. Cooper and Nephews, of Berkhamstead, Herts, England, whose head office in Australia is in Bligh Street, Sydney, have been appointed, under Royal Warrant, Sheep Dip Makers to his Majesty the King. In the colonies the bestowal of the Royal Warrant for an article like this may not seem a very important matter, but it really means a great deal, as the high standard upon which the King's farming and sheep, cattle and horse-breeding are conducted at Windsor, Sandringham, and Balmoral, are a sure guarantee that in the important matter of dipping no article that was not considered the best that could be obtained would have any chance of being used. The firm have been manufacturing their famous dip for over sixty years, and it must be gratifying to them to get the seal of Royal approval from so practical and successful a breeder as his present Majesty.

To make Sweet Cream from Sour Milk.——At the Virginia Experimental Station a method has been discovered by which milk of an inferior quality can be treated so that it can be put on the market, either as cream or butter, in a highly satisfactory condition This desirable result can be brought about by close skimming, eliminating largely the milk serum (or skim milk) which contains, in a large measure, the acid and bad flavours found in inferior milk. (The experiments, it may be explained, showed that the acidity and bad flavours are almost entirely in the "solids not fat," and do not extend to the fat till very late.) The highly concentrated cream can then be diluted with fresh and untainted skim milk, and cream of any desired per cent. of fat made from it. By this method bad flavoured milk, and sour milk, provided the acid has not developed to too great an extent, can be utilised in a highly profitable and satisfactory manner. In one of the experiments, milk with a strong garlic flavour had this entirely taken out of the cream by being twice separated in the above manner. After the first separation the cream was immediately remixed with sweet untainted skim milk to the consistency of new milk, and then again separated. The cream was then found to be of excellent quality. In other experiments the amount of acidity was reduced by one separation and remixing to about the same amount as was present when the milk came fresh from the cow.

THE DISEASES OF ANIMALS AND MEAT INSPECTION IN WESTERN AUSTRALIA.

By J. Burton Cleland, M.D., Ch.M. (Syd.), Government Bacteriologist and Pathologist, Perth, W.A.

(A Paper read before the Adelaide Meeting, Australian Association for the Advancement of Science, Adelaide, January, 1907.)

The importance, from a public health point of view, attached to the proper supervision of meat supplies, is increasing year by year. In this connection, the Chicago scandals of 1906 have marked an epoch, and the public are now no longer apathetic but justly insistent upon their right to be served with meat foods, about which there can be no question.

Western Australia, for its thickly populated districts, possesses a highly efficient staff for the inspection of meat. This consists of five inspectors, all specially trained in their work, three of whom deal with the abattoirs at Fremantle, one with the smaller ones in the neighbourhood of Perth, and one with those at Kalgoorlie.

To aid them in understanding exactly the nature and modes of spread of the diseases with which they deal, they have further spent a considerable amount of time in doing elementary bacteriology and pathology in the Laboratory of the Central Board of Health. To the Laboratory are also forwarded all interesting or ambiguous diseased organs for further examination, so that the exact nature of every pathological state can be ascertained. Each inspector is also furnished with a number of printed cards, one of which is filled in for each animal showing any sign of disease, the particulars enumerated being the disease, its position, the age and sex of the animal, the abattoir where slaughtered, and the locality whence the animal came. It is hoped that, in this way, very valuable data will be obtained, indicating not only the nature of the diseases met with, but also their relative proportions and the localities in which they occur.

INFECTIOUS DISEASES COMMUNICABLE TO MAN.

(1.) *Tuberculosis.*

A reference to the tabulated result of three months classification of the pathological lessons in slaughtered animals, will show you that tuberculosis is a common disease amongst the North-West cattle of Western Australia, and amongst the pigs of the more Southern portion.

Of the total cattle killed at the Fremantle abattoirs 8.8 per cent. had tuberculosis : of 383 of these, 357 were from the North-West. At this season of the year, however, nearly all the cattle are from that region, only a small minority being from the more southern portions of Western Australia, or from Eastern States. The above percentage, then, will represent fairly accurately the extent of this disease in the North-West, though it is probably slightly under-estimated.

This percentage of 8.8 compares favourably with the figures given by Legge and Sessions for various Continental towns, thus :—

Leipzig, 1897.—Number of cattle slaughtered, 27,191. Percentage tubercular, 36.4.

Carlsruhe, 1895.—Number of cattle slaughtered, 9,496. Percentage tubercular, 10.4.

Stettin, 1895.—Number of cattle slaughtered, 8,818. Percentage tubercular, 22.7.

Amongst sheep, tubercular lesions of the liver have been twice met with.

I will not discuss, in this paper, the possibility of danger to human beings from the products of tubercular cattle. These dangers may be divided into two groups, according to the nature of the foodstuffs, viz. :—(1.) The meat of tubercular animals, and (2) the milk of such. The latter is outside the province of this article. Authorities differ upon the first group, though the majority consider there is a decided danger in eating partially cooked meat containing "bovine tubercle bacilli," and all agree as to the advisability of removing all the diseased parts.

But what I particularly desire to ascertain and to ask a remedy for is the means of preventing the spread of the disease. Year by year hundreds of cattle over vast areas are affected ; they spread the disease further and further afield, and the monetary loss to cattle-owners, not to speak of the danger to human beings, must be great and ever increasing. Can nothing be done to check this scourge ? Can no means be taken to prevent its extension ? The first question to be decided is what is the means of spread—(*a.*) in cattle, (*b.*) in pigs. This having been decided, we then come to the second question : What means can be recommended to limit its extent ?

Indications of the means of spread in Cattle.—On consulting the tabulated results, it will be seen that in 76.4 per cent. of the cases, the lungs were affected ; in 34 per cent,, these alone.

The retropharyngeal glands were tubercular in 55.5 per cent., and these alone in 33.3 per cent. In only four instances (.83 per cent.) were the lesions generalised. In 13 cases the glands draining the scrotal pouch were affected, evidently indicating an infection of the wound of castration. Cases not included in the above groups in which other organs were diseased, form a small minority of 30 (.83 per cent.), all connected with the alimentary canal.

The small percentage of those in which the parts connected with the alimentary canal were affected alone, negatives, I think, the likelihood of food infection. This is supported by the fact that cattle rarely browse over the same tract as one of their fellows, and this would lessen the the risk of such infection by contaminated pastures.

We see, instead, that the chief burden falls on the lungs and glands in the thorax, and next to them on the retropharyngeal glands. This suggests at once inhalation of the tubercle bacilli, which would draw them either directly into the lungs or else would allow of their arrest in the upper air passages, such as the pharynx, whence they would easily reach the various lymphatic glands of the neck. Cattle, we know, rest together at night time and frequently lick each other, and either of these processes would give ample opportunities to diseased cattle to distribute tubercle bacilli amongst their fellows.

In pigs, the glands of the neck bear by far the chief incidence of the disease. In them I think it is probably due to the feeding on improperly cooked tubercular milk or meat, the bacilli gaining entrance through the mucous membranes. The remedy is obvious.

The Prevention of Extension of Tuberculosis in Cattle.—I am afraid I can suggest but little of practical import here. It is imperative, however, that something should be done, and I should like strongly to urge that the Federal Government should appoint a commission to investigate the matter and devise remedies. Otherwise, it will be again the cry, "Too late! Too late!" Stock-owners might be induced to destroy all obviously diseased animals and burn their carcases, and to segregate the calves from the rest of the herd, while infected districts might be sharply marked off and quarantined from non-infected.

(2.) *Actinomycosis.*

Actinomycosis, caused by the ray-fungus, and most typically known in the condition called "Lumpy Jaw," is not very rare in North-West cattle. Twenty-seven cases in cattle have been met with in various parts of the body in three and a-half months. The fungus is probably introduced attached to grass seeds. It is rarely, if ever, conveyed directly from animals to man.

(3.) *Other Infectious Diseases.*

Anthrax may possibly exist in the State, but has not yet been reported as such.

Foot and mouth disease, trichinosis and measles (*Cysticercus cellulosæ* in pigs, and measles in cattle (C. bovis), are so far not known.

DISEASES INDIRECTLY COMMUNICABLE TO MAN.

Hydatids.—This disease, conveyed to man, cattle, sheep, and pigs through the intermediation of the dog, is of fairly common occurrence throughout the State.

To prevent its spread, the viscera of all animals slaughtered and containing hydatid cysts should be rendered sterile before giving the offal to dogs. Dogs are forbidden within the precincts of our abattoirs.

Inspection.—As to this, there is no direct danger to man, when the cysts in the liver are few or small; the affected portions are removed and destroyed and the rest passed. If the invasion is extensive, the part is condemned.

EPIDEMIC DISEASES NOT COMMUNICABLE TO MAN.

Pleuro-pneumonia of Cattle.—During the nine months under my notice, very few cases of this disease were met with. Cattle from Wyndham, where pleuro-pneumonia was very prevalent last year, frequently showed a fibrotic condition of the lungs with pleuritic adhesions.

As this disease is not communicable to man, the instructions to meat inspectors are that only when the animal is slaughtered at the height of the disease and the carcase is "fevered," or when there is evidence of much absorption from septic foci in the lungs, should the carcase be condemned.

Tick Fever.—Tick fever is endemic amongst the cattle of certain parts of our North-West. When cattle from "clean" country pass through these infected areas on their way to the coast, they are very liable to contract tick fever. Consequently, it is no uncommon event for animals to reach the abattoir while at the height of the disease or during recovery. If the carcase is "fevered" (*i.e.*, indicates that the animal at the time of slaughter had severe pyrexia), it is condemned; on the other hand, even if considerably jaundiced, if there are no signs of pyrexia, the carcase is passed. This is founded on the fact that jaundice may persist for some while after the height of the disease is over, and that tick fever is a disease which cannot be communicated to man.

Swine Fever.—A mild epidemic of this disease occurred amongst some herds early in the year with considerable mortality. Though the post-mortem lesions closely resemble those of typhoid in man, the disease cannot be transmitted to man, and the carcases are dealt with as those of pleuro-pneumonia and tick fever in cattle.

Swine Plague and Swine Erysipelas.—No authenticated instances of the occurrences of epidemics of either of these diseases in Western Australia has come to my knowledge.

DISEASES DUE TO PROTOZOA.

Tick Fever of Cattle.—This has already been dealt with. It is due to a parasite of the red blood corpuscles (*Piroplasma bigeminum*), transmitted by the tick (*Rhipicephalus undulatus*).

Tick Fever of Fowls (*Spirillosis*).—This disease, due to a spirillum in the blood transmitted by the tick Argas, occurs extensively in Perth, and is very fatal.

Spirochaetes in Castration Wounds of Pigs.—Pigs frequently exhibit large tumours at the seat of castration. These possess a thick fibrous wall with a central cavity containing a little thick purulent material. In this pus, amongst other bacteria, were, in every instance examined, numerous delicate spirochaetes.

DISEASES DUE TO WORMS.

Cystic stage of Cestodes.

Hydatid Cysts.—The cystic stage of *Taenia echinococcus* of the dog. Occurs in cattle, sheep, and pigs. Already dealt with.

Cysticercus tenuicollis.—The cystic stage of *Taenia marginata* of the dog.

During the three months under review, the liver and lungs of many of the sheep and lambs (in 1,120 out of 20,634), have been invaded by this cysticercus, the organs being absolutely riddled by them. They have been, also, not infrequent in the pig. At this time of year, the ova seem to be ingested by their host, and are found making their way, *via* the liver or lungs, into the serous cavities. Their tracks in the liver and lungs—occupied by necrotic dèbris—are often very noticeable. Apparently the great majority perish during their progress, as it is rare to find, later on in the year, more than a few adult cysticerci.

Adult Cestodes.

Taenia ovilla is found frequently in lambs. How is it this worm disappears in the adult ?

Taenia denticulata of cattle.

Trematodes.

Distoma hepaticum (fluke) is found not infrequently in the livers of cattle and sheep from the Eastern States. It has not so far been recorded I believe, for W.A.

Amphistoma conicum is fairly common in the rumen of Eastern cattle. Inspector Clutterbuck has called my attention to the fact that so far it has always been associated with fluke in the liver.

Nematodes.

Ascaris suilla is common in the pig.

Strongyli are met with not infrequently in the lungs of cattle, sheep, and pigs.

Spiroptera nodules are common in cattle, embedded in the muscles.

Larval nematodes in nodules in intestine of bullock.—In one instance, the intestines of a bullock were found studded with scattered, round, firm nodules, in which were found larval nematodes.

OTHER PATHOLOGICAL CONDITIONS.

During nine months, the following interesting conditions have been met with :—

Malignant (Cancerous) Growths.

Cancer in the Breast in a Cow (aged).—The udder was affected with a scirrhous mass. The sub-lumbar and other glands were secondarily affected.

Cancer of the Breast in a Lioness (10 years)).—Malignant growth in udder and sub-lumbar glands, etc. Numerous secondary deposits in lungs, liver, and spleen. Also growths on pleural surface of one rib, in omentum, and probably in kidney.

Malignant growth of Suprarenal Gland in Sheep.—The suprarenal was much enlarged and the growth extended below into the right kidney and above into the livèr. The liver and lungs were occupied by numerous large secondary deposits.

Malignant Tumour of Mediastinum in Bullock forming a cap to the heart.—This very large growth was formed of masses of large cells in alveoli.

Simple Tumours.

Chondroma of Rib in Sheep.—A large cartilaginous tumour the size of the fist.

Melanotic fibromata.—These were found several times in cattle in various subcutaneous parts.

MELANOTIC PIGMENTATIONS.

A very interesting series of melanotic pigmentations has been met with both in cattle and sheep. Macroscopically and microscopically, the pigment looks like melanin and it answers to the rough chemical tests for this substance. Its origin is shrouded in obscurity. One case suggests the cortex of the suprarenal as being the producer, while others are generally attributed to the nature of the food.

Melanotic livers of Sheep (Saltbush Liver).—These are of frequent occurrence in the livers of Eastern sheep. The organ is a deep bluish black and in sections the lobules are mapped out. The portal glands are similarly pigmented. Microscopically, there is a deposit of melanin granules in the liver cells and in the lymphoid tissue. The organs are called "saltbush livers," from the idea that feeding on this shrub causes the pigmentation.

Melanotic Deposit in Kidney of Sheep.—A dark, black pigmentation is seen in the cortex. Microscopically, the basement membrane of some of the tubules is occupied by a black pigmented material.

Intense Melanotic Pigmentation of Suprarenal and Connective Tissue of Bullock.—This case is very interesting. The cortex of the suprarenal is somewhat enlarged and jet-black. There is a dense accumulation of melanin granules between the cells. The medulla seems free. In addition to this, there are several large wedge-shaped areas of melanotic pigmentation with granules in the lungs, extensive blue black pigmentation of the connective tissues round the aorta, and a similar colouration of the dura and pia-mater of the spinal cord and part of the brain. Another similar, but less marked case, has also been met with.

Melanotic Pigmentation of Lung of Bullock.—In another animal similar wedge-shaped black areas were found in the lungs.

FAT NECROSIS IN BOVINES.

Animals are frequently slaughtered in which the omental, perirenal, and other abdominal fat is extensively converted into a whitish, more friable, and firmer substance which microscopically is found to consist of needle-shaped crystals in rosettes in the fat cells. This is evidently of the nature of fat necrosis. Is its origin possibly microbic, due to the fat-splitting power of some bacterium ? Inspector Buckley informs me that it is found almost invariably in cows. If so, has it any relation to pregnancy ?

Occasionally in the brisket of bullocks a putty-like deposit is found, but this has no relation to the above.

CATTLE SLAUGHTERED AT FREMANTLE ABATTOIRS.

(For three months, from part of August to part of November, 1906.)

Number slaughtered	4,067 and Calves 37
" " with pathological lesions	665 equal 16.4 p.c.
Tubercular Cattle	360 equal 8.8 p.c.

Of tubercular cattle, 275 lesions in lungs equal 76.4 p.c.

Of tubercular cattle, 200 lesions in retropharyngeal glands, etc., equal 55.5 p.c.

Actinomycosis	26 equal 6 p.c.
Hydatids	84 equal 2 p.c.
Fluke	26 equal 6 p.c.

TUBERCULOSIS IN CATTLE.

Number of Cattle slaughtered and examined in Fremantle Abattoirs in three months, 4,067.

Of these, 360 were tubercular, equal to 8.8 p.c.

Of the tubercular cattle :—

In 275 (76.4 p.c.), there were lesions in the lungs, bronchial or mediastinal glands.
In 200 (55.5 p.c.), the retropharyngeal or other glands of the head were affected.
In 25 the liver.
In 2 the intestines (ulcers).
In 3 the peritoneum.
In 13 the scrotal glands.

TUBERCULAR CATTLE.

Generalised (in 1 in muscle)	equal	4
Lungs (including bronchial and mediastinal glands) ..	„	122
Lungs and retropharyngeal or head glands	„	120
Lungs and Liver	„	14
Lungs and Pleura	„	1
Lungs and pleura and pericardium	„	1
Lungs and pericardium	„	1
Lungs and head and liver	„	1
Lungs and head and liver and mesentery	„	5
Lungs and head and pleura	„	1
Lungs and head and pericardium	„	2
Lungs and head and scrotal glands	„	1
Lungs and head and scrotal glands and penis ..	„	1
Lungs and head and intestines (ulcers)	„	1
Lungs and head and tongue	„	1
Lungs and head and tongue and liver	„	2
Lungs and submaxillary gland	„	1
Tub. broncho-pneumonia	„	2
„ „ and head	„	3
Retropharyngeal glands	„	56
„ „ and liver	„	1
„ „ and liver and tongue	„	1
„ „ and parotid and submaxillary glands	„	1
„ „ and prescapular gland and stomach	„	1
Parotid and cervical and mediastinal glands	„	1
Intestines (ulcers)	„	1
Scrotal glands	„	9
Scrotal glands and precural glands and penis	„	1
Scrotal glands and sublumbar glands	„	1
Peritoneum and liver	„	1
Peritoneum from stomach	„	1
Lymph gland of udder	„	1
Total		360

LOCALITIES FROM WHICH THE TUBERCULAR ANIMALS CAME.

During the three months in question, the number of cattle from the Eastern States killed at these abattoirs were very small, probably only a few hundred. By far the greatest number came from the North-West.

North-West	357	tubercular cattle
Midland Districts, Carnarvon, etc. ..	14	tubercular cattle
Perth District	3	tubercular cattle
Eastern States	9	tubercular cattle
Total	383	

ACTINOMYCOSIS IN CATTLE.

Number slaughtered		4,067
Number with Actinomycosis		27
Liver	13	
Lungs	7	
Jaws	2	
Head and Liver	1	
Cheek and Lungs	1	
Muscles of Thigh	1	
Peritoneum and Omentum	1	
Hoof	1	
Localities —		
North-West	18	
Midland Districts	6	
Eastern States	1	

ANIMAL PARASITES OF CATTLE.

Number of Cattle examined in 3 months		4,067
Of these there were affected with—		
Hydatids.		
Lungs	21	
Liver	21	
Lungs and Liver	42	
Total . ..	84	
Fluke (in Liver)	26	
Total	26	

'Amphistoma Conicum in Stomach (with Fluke in Liver)—Total	2
Tape-worm (probably many more) ... ... „	1
Strongylus micruris in Lungs ... ... „	7
Tick-fever (due to pirosoma bigeminum) ... ... „	24

Of the Hydatids:—

58	were from the Eastern States.
19	„ „ Midland Districts.
7	„ „ the North-West.

All the Fluke and Amphistoma were from the Eastern States. The Strongyli and Pirosomata were from the North-West.

MISCELLANEOUS DISEASES OF CATTLE.

Lungs.

Fibrosis of lungs or chronic abscesses or pleuritic adhesions (probably the after effects of pleuro-pneumonia, most coming from a district where this raged last year) ...	69
Pleuro-pneumonia	1
Broncho-pneumonia and ship pneumonia	30

Inflammatory.

Abscesses—	
Of hindquarter	1
Mesenteric (chronic)	1
Intestinal coils	1
Liver (chronic)	2
Capsule of liver	1
Peritonitis	1
Peritonitis (traumatic)	1
Purulent endometritis, with fibrosis	4
Suppuration round tail	2

Injuries.

Bruising, etc.	5

Melanotic Conditions.

Melanosis of suprarenal capsule and connective tissues ...	1
Melanotic patches in lungs	1
Melanotic fibroma of hock	1

Various.

Fat necrosis	4
Emphysema	1
Cirrhosis of liver	1
Putty-like deposit in brisket	1
Staphyloma of eye	1

Tumours.

Lymphadenoma of the thorax (huge growth)	1
Carcinoma of breast, with secondary infiltration of glands in old cow	1
Growth of kidney	1

SHEEP AND LAMBS SLAUGHTERED AT FREMANTLE ABATTOIRS.

(For three months from part of August to part of November, 1906.)

Number slaughtered	20,634
Number with pathological lesions	1,497

PATHOLOGICAL LESIONS IN SHEEP.

Animal Parasites.

Invasion of liver, etc., with Cysticercus tenuicollis		1,120

Hydatid Cysts.

Liver	175	
Lungs	5	
Liver and Lungs	74	
Total	254	
Strongylus filaria or rufescens in lungs		24
Fluke in Liver		6

Infectious and Microbic conditions.

Tuberculosis—of liver	3	
Total	3	
Pseudo-tuberculosis—of prescapular glands	3	
of lungs	1	
Total	4	

Various.

Cirrhosis of liver	5
Melanosis of liver	15
Melanosis of lung	1
Congestion of liver (? shipboard)	20
Nodules in liver, caseous or firm	5
Necrotic foci in liver	3
Infarct of liver...	1
Melanotic subcutaneous tissue	1
Malignant disease of suprarenal gland with secondary deposits	1
Bruising and emaciation	

LOCALITIES OF DISEASE IN SHEEP.

Cysticercus tenuicollis ...	General throughout the State.	
Hydatid Disease	North-West	33
	Midland District	119
	Perth District	29
	Eastern States	29
Fluke	Eastern States	13
Strongyli in lungs ...	Midland District	18
Pseudo-tuberculosis ...	Eastern States	4

PIGS SLAUGHTERED AT FREMANTLE ABATTOIRS.

(For three weeks from part of August to part of November, 1906.)

Number slaughtered	1,801
Number with pathological lesions ...	149
„ „ tuberculosis	61
„ „ hydatids	12

(Owing to the scattered nature of the abattoirs where these animals were killed, complete supervision by the inspectors could not be maintained. Hence these figures must be considered as much lower than the actual ones.)

DISEASES OF PIGS.

Number with pathological lesions 149

Tuberculosis.

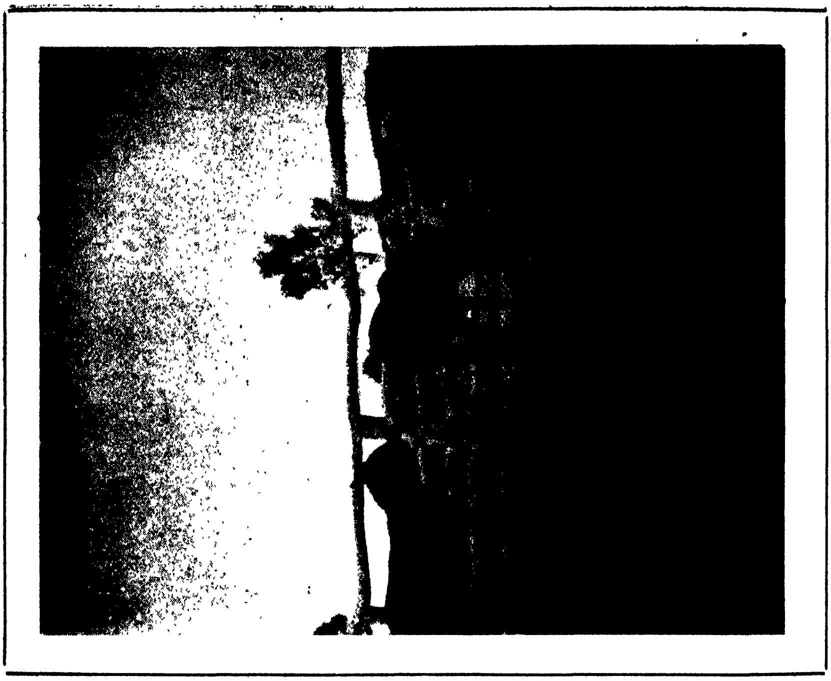
Generalised	3
Submaxillary or neck glands	41
Submaxillary or neck glands and liver	6
Submaxillary or neck glands and lungs	2
Submaxillary or neck glands, pleura, and liver	1
Submaxillary or neck glands, lungs, pleura, and sublumbar	1
Submaxillary or neck glands, lungs, and spleen	1
Lungs	3
Lungs and liver	2
Supramammary gland	1
Total	61

Infective and Acute Inflammatory conditions.

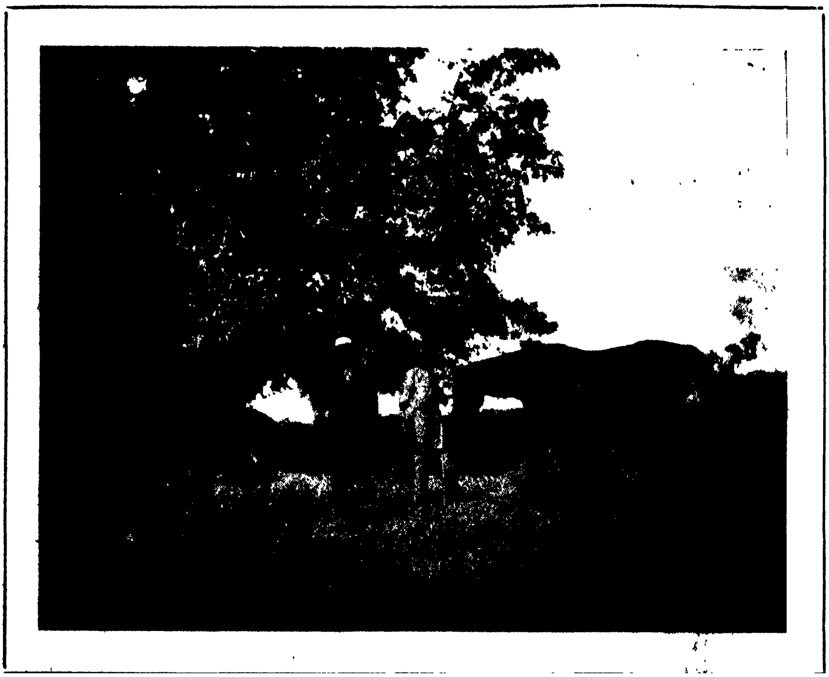
Swine fever	13
Influenza (?)	7
Broncho-pneumonia	8
Septic pneumonia	2
Pneumonia and pericarditis	1
Pericarditic adhesions	2

Diseases due to Animal Parasites.

Hydatid of liver	7
Hydatid of lungs	1
Hydatid of liver and lungs	3
Hydatid of liver and spleen	1
Total	12
Cysticercus tenuicollis in liver, etc.	7
Demodex of skin	2



Jack and young mule, Oscar Range.



Thorough-bred sire "Field Artillery." Thorough-bred mare and foal.

THROUGH THE KIMBERLEYS.

OSCAR RANGE STATION.

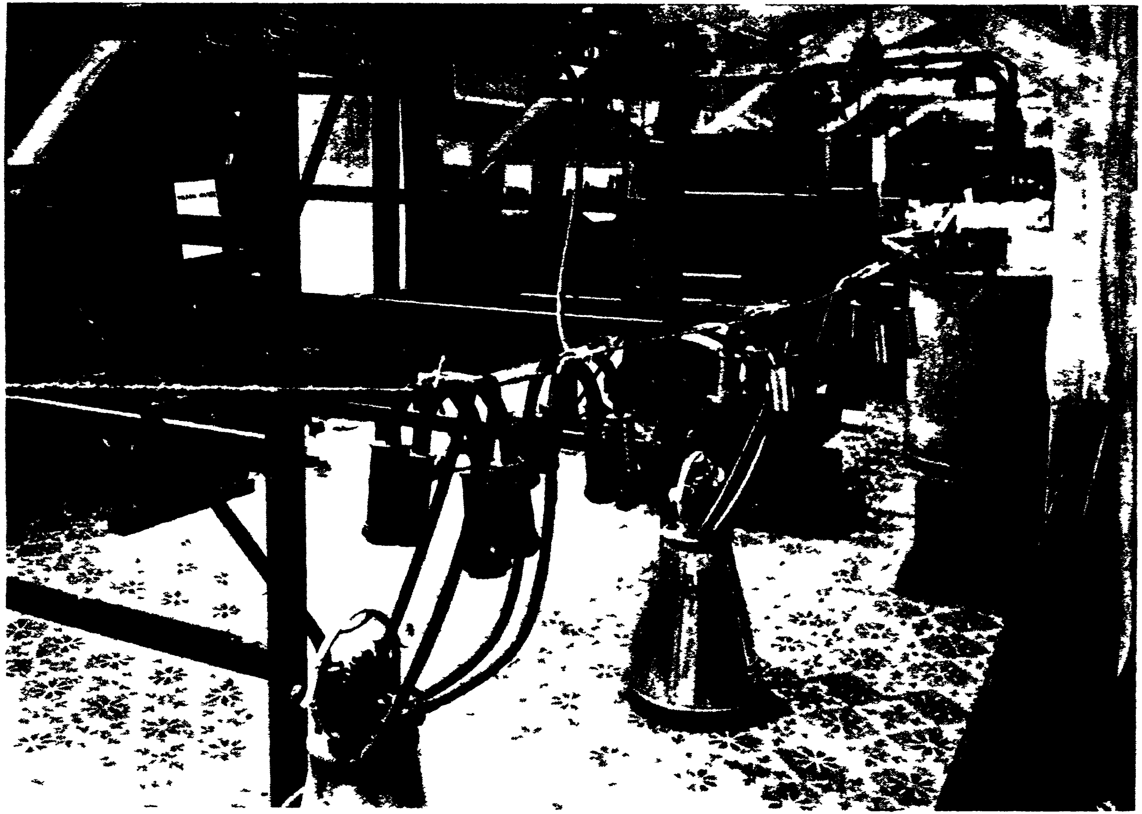
By R. E. Weir, M.R.C.V S., C.G.S.

About 12 miles from the Fitzroy Crossing, on the direct telegraph road, the homestead (a substantial stone edifice) of Oscar Range is situated on a well elevated position in close proximity to a long range of limestone rock which runs through the centre of the property. This particular station was very much in evidence some nine years ago when the homestead (then a miniature hut) was surrounded by a tribe of blacks under a notorious leader commonly known as "Pigeon." Bearing quietly down from the ranges at midnight they speared to death a traveller who was asleep near the stockyards, and the owner of the property had also a narrow escape from a similar fate. The situation was ultimately saved by the arrival of the police on the following day. The ringleaders were either captured or shot, with the result that no further trouble has since arisen, and the native boys are now working harmoniously with the whites to their mutual benefit. The holding was originally occupied by a Mr. J. Collins, an early pioneer of Kimberley, and a person of rare natural resources, who did much during his lifetime to improve not only his own property, but also the general conditions prevailing in that part of the State. Unfortunately his demise occurred at a period when, after many years of hard toil, and frequently unsatisfactory returns, the consummation of his life's hopes were about accomplished. During the latter part of his life he was associated with Mr. Edgar, the well-known Strathalbyn breeder, who has since taken over the whole property and given an interest to a well-known North-Wester (Mr Corbett), who has recently taken over the management. This gentleman is very wisely following out the policy originally inaugurated by the late proprietor, and in the space of a very few years "Oscar Range" should be the most-up-to-date station in the whole of West Australia. About 7,000 head of cattle, besides a large number of horses, are at present on the run, but the carrying capacity will be materially increased when the improvements now being effected are brought to a state of completion. Special attention is being paid to breeding, and by the fusing of well-bred bulls periodically drawn from "Strathalbyn" the station herd is now showing the benefits derived from such a wise procedure. Some thoroughbred mares of notable pedigree and a most suitable sire, "Field Artillery," have recently been transferred from the De Grey station, and were looking in good condition, although the season was anything but a favourable one. Mule breeding has also been initiated, and a valuable jack has been imported from America at considerable cost. This animal is now quite at home on the station, and, by reason of his musical voice and aptitude in showing his teeth, he has established a reputation which is not likely to be in any way interfered with. The accompanying photograph shows this animal, together with the first of his progeny, which was born shortly before my arrival on the station, and from its sturdy appearance should develop into a strong, useful animal, and, in all likelyhood. prove the forerunner of a valuable industry. Kimberley disease in horses, which has been so prevalent in past years, has now practically ceased on this station. This welcome change has been brought about as the result of my visit to that part of the State some nine years ago. It was then ascertained that the chief cause of the trouble was due to the indigestible nature of the pasture, particularly during the dry season; and, as a preventative, the growing of artificial fodder and its distribution to the horses was recommended. This was immediately acted upon by the late proprietor, and, with the addition of iron and salt, placed in easily accessible troughs, a cessation of the trouble occurred, and what was once a serious loss has now been turned into a substantial gain, even to the extent already mentioned—that highly-bred animals can now be reared with safety on the run. Land suitable for the cultivation of green fodder exists adjacent to the homestead, and, by means of irrigation, maize, sorghum, and paspalum are successfully grown for stock use, and all manner of vegetables, including potatoes, are cultivated for household purposes. Two cotton trees have also been planted as an experiment; their growth has been particularly rapid, and, from their present appearance, it may be reasonably concluded that cotton-growing could be successfully propagated in those parts, but it is doubtful whether the labour conditions would permit of its being a financial success. The transformation scene which irrigation produced on this small plot of land caused the management to consider the advisability of testing certain waterless areas of country for artesian water, and a bore was then being put down in "dindau" country, with the result that a good supply of water has since been obtained. The continuation of this system of improvement will mean that the carrying capacity of the run will be greatly enhanced, and the danger from droughts to a very great extent minimised. Large areas of what is known as "dindau" in West Kimberley, and "wideaness" in East Kimberley, is utterly devoid of surface water, but is invaluable in that it provides good nourishing top-feed for stock when the natural grasses in other parts become dried and unnourishing. The success attained in this direction at the "Oscar" is likely to be the means of causing others to carry out similar works, and thus materially improve their own properties, to the advantage of the State as a whole.

MILKING MACHINES AT PERTH EXHIBITION.

By Percy G. Wicken.

The first milking machines installed in Perth were to be seen at work at the Court of the Department of Agriculture, at the late Perth exhibition. Although up to the present we have not an installation of these machines in practical use in the State, there is no doubt that before long it will be demonstrated to our dairymen that the use of these machines will prove a profitable investment. In Victoria, New South Wales, and New Zealand, where dairying forms one of the leading industries, the value of these machines to the dairy farmer has been demonstrated, and that they have proved successful is indicated by the number of machines that have been



Milking Machines, Department of Agriculture's exhibit at the late Perth Exhibition.

installed, and also by the fact that the makers have the greatest difficulty to cope with orders. Milking machines of different types have been on trial for many years past, but it was only about two years ago that the Gillies improved cup brought the machine into practical use. This improvement enabled the machine to do good work, and remedied the one weak point in its construction. The machine, known as the Lawrence-Kennedy is now known as the Lawrence-Kennedy-Gillies. Mr. Gillies, who made the improvement in the machine, was a dairy farmer in the Warnambool district in Victoria, and his practical knowledge of the dairying industry enabled him to hit on to the improvement necessary to perfect the machine.

Each machine consists of two sets of four cups, from which the milk runs into a can in the centre of the bails. For the purpose of working these machines, double bails are required so that two cows can be milked at once. On top of each can is a pulsator worked by the vacuum from the vacuum tank, which is in turn pumped free from air by means of a small air pump. The can is placed in the centre of the bails and the cups adjusted on the teats of the cows, the tap turned on, and the milk flows down the tubing into the milk bucket. The action inside the cups is such that the milk is not drawn from the cows by means of a vacuum, but the inside of the cup, which is composed of rubber, is made to pulsate, and presses the teat in a similar manner to that of the hand when the milking is performed by hand labour. As soon as the machine has been placed on two cows, the man in charge proceeds to the next bail, in which he bails up two more cows, washes their udders, etc., and as soon as the cows on which the machine is at work have ceased milking, he shuts off the pulsators and shifts the machine to the next bail and puts it onto the cows there; he then returns to the first bails, releases the cows, and bails up two more, and so on. According to the time of the year, or the amount of milk the cows are giving, one man with the aid of the machine can put through 14 to 18 cows per hour. Consequently, an installation of three pulsators is capable of dealing with about 50 cows per hour with a minimum of labour.

An installation consists of any number of pulsators, according to the number of cows proposed to be dealt with, a three can installation being sufficient for 100 cows; a vacuum tank, air pump, and the necessary piping, stop cocks, vacuum indicator, etc. In addition to this there is the necessary motive power to be found to drive the air pump. A two-horse power oil engine is sufficient for a small installation, but any form of power already on the farm can be used for this purpose, or a small boiler can be used instead of an air pump, as an ejector can be fitted which will be considerably cheaper in the first instance, but where fuel and water are any consideration a small engine would prove most satisfactory. A similar plant to that at work in the exhibition building can be purchased for about £100 without the motive power, and that anyone with a herd of about 100 cows would be able to pay for the plant in less than twelve months owing to the saving in his bill for labour. One of the great advantages of the milking machine is that it makes the dairy farmer to a great extent independent of the labour question, which to the man who has a herd of cows in full milk is a very serious item. Labour for milking cows is often difficult to obtain, and when obtained, is often unsatisfactory, as those engaged in the industry know to their cost. The cows have to be milked at regular and stated intervals, and if for any reason this is not done very bad results follow. In the event of his men leaving or going on strike, the dairy farmer in a large way is to a great extent at the mercy of his employees, and often to save his cows has to concede terms that he would not otherwise do. With an installation of milking machines the dairymen is to a great extent independent of labour, as in the first place he can do with about half the hands he requires for hand-milking, and in the event of any trouble occurring can, with very little more labour, manage to milk the cows himself by working the machines a little longer, and this might be impossible if he had to milk them by hand. During a recent visit to Victoria, the writer was told of an instance in which this occurred, and the owner was able to milk 82 cows in 2½ hours, single-handed. Such a feat would be impossible if the cows had to be milked by hand. The stalls required for operating the milking-machine should be 7ft. wide, and constructed to accommodate two cows, so as to permit of the pulsator standing between them. One cow is roped on the off leg, and the other on the near leg; any ordinary form of bail is suitable. While being milked the cows stand much quieter than when being milked by hand, and most of those who have used the machines seem to agree that the milk flow increases when the machines are used.

In the Annual Report of the Department of Agriculture in New Zealand, where there are a number of milking machines at work, the following points are given as the result of the year's work with the milking-machines in that State : –

1. There have been no delays or breakdowns; the machine operates with the greatest regularity.
2. It eliminates the undesirable employment of children.
3. It effects a great economy in the number of milkers and in general cost of labour.
4. It warrants the payment of higher wages to responsible men.
5. It is far more comfortable to the cow. The animal almost always ruminates while milking is proceeding. Kicking, restless cows remain more quiet when being milked with the machine than when the operation is being performed by hand.
6. Sore and chapped teats are quickly healed.
7. The average quantity of milk is certainly maintained.
8. Stripping is no more necessary than in hand milking.
9. The process of milking is effected incomparably more cleanly.
10. It will assure the safe investment of capital in the further development of dairying.

Finally.—It is effective, economical, and clean.

All those interested in the dairying industry should see these machines in operation at the earliest opportunity.

MAZZAGUA

(*Sorghum cernuum*).

A NEW FODDER PLANT.

Attention has been drawn to the probable value of a new kind of corn grown by the settlers in Nigeria, and on the West Coast of Africa called Mazzagua. It grows to the height of from nine to ten feet, and bears a head of eight to nine inches in length. The seeds are about the size of a pea, which the settlers grind up, and make an excellent bread from, besides which the leaves and stalks make splendid fodder.

The matter having been brought under the notice of the Agricultural Department, a request was sent to the British Consul, Nigeria, for particulars. The following report has just been received in reply, together with a promise to forward some seed later on:—

Report by W. R. Elliott, Forestry Officer on Mazzagua Seed ("Dry Season Corn").

Mazzagua is a variety of Guinea Corn that is grown during the early months of the dry season, on the upper reaches of the Benue River, and in parts of the Bornu Province.

In Bornu, especially between Maiduguri and Kuka, there is a considerable amount of land that is swampy during the wet season, and on the Benue the banks become inundated during high water, and there are miles of swampy land running for miles inland, especially on the North Bank, from Amara upwards.

At the termination of the rains—about the latter end of September, these swamps gradually get rid of their surface water; but the soil is of such a nature that it retains a considerable amount of moisture for several months in the dry season. The soil in these places is a black clayey loam, and becomes hard-baked on the surface, and full of cracks after a short exposure to the sun.

It is on these drying-up swamps that large crops of the Mazzagua are grown.

It is misleading to state that the plant receives no water during its period of growth, as the contrary is the case, the plant receiving a sufficient supply of water at the roots throughout.

The plants are raised from seed, which is sown in August, and by the end of September, when the swamps have commenced to dry off, they are from *1 foot* to *1 foot 6 inches* high. They are then transplanted into the swamp in regular rows about 6 feet apart. They are kept clean and carefully cultivated, and by end of December the crop is reaped.

The growth of the plants is most luxuriant. They grow from 8 to 10 feet in height, and the stem is often 10 to 11 inches circumference. They bear dense heads of grain, which is about the size of a pea. This luxuriant growth is due to the conditions under which the plant is grown, an abundant supply of water at the roots, and the full benefit of the sun above.

The rainfall in the districts where Mazzagua is grown does not exceed 20 inches a year, May to September being the rainy months.

It is a most valuable product, and its cultivation might be greatly extended in the Protectorate, as there are many parts where similar conditions of soil obtain and which remain uncultivated.

Botanical specimens of the plant have been obtained.

DAIRYING INDUSTRY.

A writer in the *West Australian* states *inter alia* :—That the question, does dairying pay in this State, can only be answered by those who have tried it themselves. Farmers are not more reticent about their business than those in other industrial branches, but all the same they do not care to show too much of their business. As one who has tried dairying under varying disadvantageous surroundings, perhaps my experience may be useful.

Dairying does pay, even under the conditions of purchasing the bulk of the fodders to feed the cows, and under difficulties as regards transport of milk and cream to market. The fact that I am taking up land in a more suitable district to carry on dairying shows what I think of it. Dairying for milk supplying is the most profitable branch, but this is necessarily confined to those with available transport facilities. It is dairying for butter and cheese-making that requires most attention from the authorities, because the bulk of our farmers will follow it for those purposes, perforce of circumstances. Many farmers would like to go into the business, and are deterred by want of knowledge of how to get about it. If they get any book treating of dairying, they are alarmed at the large expenditure they must go to before they can start. Now, this is altogether erroneous and misleading. You don't need those very elaborate yards, sheds, etc. If you can afford it, well and good, but you can be clean in your operations with a rough-and-ready yard and shed. The only thing you want to be particular with is the kind of flooring to your milking bails, so that they can be kept clean and sweet. Stone, gravel, brick, or even wood will serve the purpose, and it is possible to obtain one or other of the materials mentioned anywhere in this State. The outlay in this line need not alarm us.

The greatest difficulty is to obtain good cows; that was my trouble, and I had to use mostly first-calf heifers. Some of the best I have are imported from Victoria, but the best cow is Western Australian bred, and, like Mr. Gull's good cow, it would be difficult to pronounce on her breed. All experienced dairymen will realise that heifers do not produce anything like as much as second or third-calf cows. Therefore, if the heifers pay their way, as they do with me, much more profit would result from matured cows. Cows can be obtained, if not here, then in the Eastern States. Another difficulty was feed. Owing to this last season being altogether bad, according to the older residents, grass was very scanty, and the cows had to be fed more than under normal conditions of climate. Yet feed was purchased at reasonable prices in the Perth yards (the neighbouring settlers refusing to sell at all at the prices ruling), and the only difficulty was that of the abominable railway delays in forwarding the feed. Bran was also at a most reasonable price during the latter part of the season.

That there is a huge district in the south, where butter production and other dairy products could be carried on, we know, but as stated above, those holding land don't know how to get about it, and others who could show them cannot get hold of the land to settle on and become object lessons. It is rumoured that there is to be a butter bonus granted by Government, and that the method of distributing it precludes anyone but a producer of cream or milk from getting any of it. So far so good, but the best bonus of all would be a practical object lesson in the shape of a dairy farm, worked by an experienced dairyman, on the lines that every farmer could follow—a paying dairy, not merely a show business—and it is quite possible that a practical farmer like the present Minister of Agriculture may carry it out.

Dairy farming will, and does pay, when carried out on the lines learned in other States. Although at present we have to depend on conserved fodders during the dry season, we have every reason to believe that in the Paspalums and African Wonder grass we shall have a splendid green fodder to tide us over the scarce season. We shall always require hay, either as chaff or uncut, and possibly bran, to tide over the colder months, but as everything but bran can be produced on the farm, all the profit will go to the farmer himself. What that profit is the farmer knows, and one hardly cares to publish, but suffice to say that no farmer gets anything like the price for his hay or wheat that the dairyman get in feeding cows and pigs. It is a big question this of dairying, and wants a lot of attention. As Mr. Macfarlane puts it, it is a lot of small producers, what I call one-can men, that we require, not huge elaborate dairies. I believe in dairying, and will carry on dairying on a moderate scale, because milk labour is always a very unsatisfactory item, besides it is better to go slow at first, and not get involved.

I may appear to be somewhat optimistic, but I am speaking as I found it in practical working. There is no better line to follow in this State than that of dairying, and to it our farmers must look to secure a fair return for their labour.

DISTRIBUTION OF PARASITES.

By L. J. NEWMAN.

During the month I distributed 40 colonies of parasites, as follows:—

Black Scale	14	Red Scale	6
Brown Scale	10	Cabbage Aphis	10
	24		16 = 40

This is not so many as the previous months, which is due to the fact that my local supply of parasites have given out, and I have to go further afield, which takes more time.

I find the black and brown scales very heavily parasitised, and have had the evidence of many growers and our own inspectors to the effect that these scales have become subdued. The red scale parasites, I am glad to report, are again in evidence, and the orchard in which it was first liberated is much cleaner; this fact Mr. Williams, of North Perth, in whose orchard they were first liberated, admits. Inspector Jefferson also reports that they have become established in Mr. Taylor's orchard, Harvey, and are keeping the scale in check. Mr. T. Hooper also reports that they are established in Mr. James's orchard, Armadale, and can be seen on the trees.

They are also to my knowledge established in Claremont. Mr. Alpin Thompson's, Bay View Terrace, and Mr. Williamson's, "Kalbyamba," Cannington. I received two cases containing citrus trees infected with red scale from Professor Lounsbury, Cape Colony, requesting that parasites be applied, and the trees returned.

The trees were in fairly good order when I opened them, but since have gone off very much. I have had to replace them with some local plants; also a number of holes have been bored for ventilation, and covered with fine brass-wire gauze. As soon as it is possible I will forward him another box of scale-infected fruit.

Cabbage aphis has been a little more in evidence, but the parasite is very plentiful and keeping it very much in cheek.

HAMEL STATE FARM.

POTATO TESTS.

By G. Berthoud.

Potato. Red River Triumph.—American variety. Planted 18th October, 1906; seed local, being first grown from American stock; tubers very sound and free from disease; cut sets; growth dwarf, 15 to 18 inches, even and healthy; matures early, being ready for digging first week in January. Plot consisted of two rows, each 66 feet in length.

No. 1 Row.—Complete fertiliser rate of 7 cwts. per acre, and ground bluestone 28lbs. per acre were applied in the furrows and mixed with the soil before planting.

No. 2 Row.—The same, but without the bluestone.

In No 1 row the plants made the best growth, and yielded 66lbs. of large and 4lbs. of small tubers.

No. 2 row, 40lbs. large and 3lbs. of small tubers. So far the bluestone appears to be beneficial.

Taken up 19th January; tubers fair even size, round, red, set close to stalks.

First-class market potato of good table quality.

Yield approximate per acre, $6\frac{3}{4}$ tons.

Seedling No. 150.—Planted 13th October, dug 21st January, 1907. Growth moderate, stalks weak, height to 18 inches; foliage curled and dark green. Matures early; tubers oblong, flattened on sides; medium size, rather many under size; bright purple; shallow eyes and nice form.

Table quality—dry, flowery, and fine flavour.

The foliage is very liable to the attack of early brown blight; owing to this fault cannot be recommended for general culture.

Plots 12 rows, each 66ft. long.

Approximate yield per acre, 5 tons.

Seedling No. 151.—Planted 15th October, 1906, dug 23rd January, 1907. Part of the soil on this plot was treated with sulphate of iron and part with sulphate of copper, each at the rate of 28lbs. per acre, mixed in and applied with the complete fertiliser; the results of each appeared to do good, and promote growth.

Variety second early: very vigorous; stalks strong and upright; foliage large, flat, and light green.

Tubers large; skin light pink; form oblong; adheres firmly to root stalk. Rather liable to second growth. Many of the potatoes are spongy and ill-shaped. These faults are against it for general culture, otherwise the productiveness and the quality are good.

The approximate yield is 5¼ tons per acre.

CHAPMAN EXPERIMENTAL FARM.

REPORT FOR THE MONTH OF JANUARY.

By J. Keays.

The weather during the month has been exceedingly hot, frequently registering 100 to 110 in the shade, and hot easterly winds prevailing, which have dried up all grass and herbage Owing to the abundant supply of grass in this district bush fires frequently occur. Fortunately no serious damage has been done, as the fires were confined to grass country only.

Of the grape vines planted last season, about 95 per cent. have taken root, and are firmly established despite the very dry spring and summer. The fig and almond trees have also grown well; but the orange trees have been a failure

The saltbushes on sand plains continue to thrive. Stock show a decided preference for *Atriplex semmibaccatta*, commonly called creeping saltbush; this variety is considered among the best of saline herbage of saltbush country; it is very productive and drought-resisting. *Atriplex halimoides*, one of the best dwarf specimens for saltbush pastures, stands the most extremes of drought, is a hardy, vigorous grower, and for seed one of the most prolific. *Atriplex nummularium* (or old man saltbush), the tallest of all saltbushes, but not relished by stock so well as *Atriplex halimoides* or *semmibaccatta*.

During the past season the farm Suffolk stallion had a full list, and served 52 mares for the public besides the farm mares. The very moderate fee of one guinea per mare induces farmers to breed pure stock.

Pea Tests.—Report on peas (Ameer) supplied by Mr. Moss, Guildford, for trial here:—They were sown on 12th July (a few days after arrival here) on well-prepared land, 24 loads stable and cow manure per acre, and the peas were drilled in with $1\frac{1}{2}$cwts. superphosphates per acre, rows two feet apart. The crop was very poor, owing, principally, to the late sowing. To get the best results here, peas should be sown not later than May. However, I consider the Ameer pea did as well under the circumstances as the Stratagem, Yorkshire Hero, or Daisy would do. The Ameer in pod is a very plump, showy, marketable pea. Most of the Ameer peas were used on the farm for table I have saved sufficient to return to Mr. Moss the quantity supplied by him last year. I will send them to him addressed Guildford railway station.

POULTRY NOTES.

By Frank H. Robertson.

Early Hatching.

If very early-hatched chickens are wanted, now is the time of year to make arrangements for their production, or one might call them out-of-season chickens, and like out of season fruits or vegetables it pays to go to extra trouble to produce them on account of the scarcity and consequent extra prices realised when placed on the market. The natural breeding season is at its height in September and October, when most hatching is done; the pullets come on to lay at a good time if well fed, but if not, are slow in starting, but the cockerels, if for table purposes, do not strike a good market. The time of year when table birds fetch the best prices are the months of November and December, and during the past season prices were even higher than usual. Now to get these good prices, hatching wants to be commenced in April, and for egg production it is also good, especially when a regular egg supply is wanted all the year round, as these extra early-hatched pullets keep up a good egg yield late into the season; they also frequently come in useful as early broodies, and most important of all the chicks are strong and easy to rear. Of course, I do not recommend all the hatching to be done in April; moreover, this would be an impossibility. A selection of birds would have to be made for this purpose, using hens which are laying and in good condition, or extra early-hatched pullets could be used, and for a male bird use a cock bird not in the moult, if there is one; if not, take an extra early cockerel. It, however, frequently happens that no suitable birds are available just at that period, and to make sure of a supply, they can be obtained by

Forcing the Moult.

This must be commenced at once. Put up a breeding pen of, say, six hens which are not laying (it would not pay to stop egg production just now, as prices of eggs for the table are good). Reduce the feed to about one-third or one-fourth the ordinary ration, and for preference give oats, about half a handful per bird per day ; continue same for two or three weeks, at the end of which time the hens will have become quite thin. Then start feeding them well on good soft feed, giving plenty of meat and greenstuff ; also add a little sulphur to the mash when the new feathers are growing. If fowls are extra fat when first confined it will be found that the reduced feed will result in the birds brightening up, get red in the comb, and start laying instead of moulting. The required object is thus obtained, only in a different manner, and if fowls are starved but allowed a free run they will range further and pick up extra food, but not enter the forced moult owing to the extra feed. A change of climate forces a moult ; therefore, it is best to place the hens to be moulted into either warmer houses and runs or more open houses and well-shaded runs, the latter decidedly for preference in this State. Another simple way of forcing a moult is to let broodies remain on the nests until quite thin and miserable, then take them off and feed well.

THE DUST BATH.

Where a good supply of water is available, it is a good plan to liberally damp a shaded spot for the fowls to dust in ; this is just the reverse of what is wanted in rainy weather, when all the soil is wet, and the drier the dust bath the better ; but when dry hot ground is everywhere, damp sand or dust is much enjoyed, and keeps the birds free of lice. If water is scarce and not available easily, the refuse water when cleaning out the drinking vessels should be utilised for this purpose, but do not empty it close to the drinking tins as this would make a dusting place at a spot which would result in the drinking water being contaminated by the dust raised by the birds when dusting themselves.

THE RED MITE.

Poultry-keepers are likely to forget the existence of this unpleasant pest, which makes its presence particularly felt in the warm weather. It is suring how quickly this parasite multiplies, and if left undisturbed will, in course of time, take possession of every nook and cranny in the fowl-house It is not uncommon to find neglected roosting quarters a living mass of these insects all along the perches and up the walls and into the roof. When a place becomes so badly infected extermination is a difficult matter. Many persons do not know of the existence of such a thing as red mite ; it is the common fowl-house louse, is a little red insect when well nourished, and is in every fowl-house where not kept down. Some fowl-houses which the writer has seen on farms in various parts of the country were found to be in a deplorable state. Lime-washing is generally used to get rid of the pest, but it is not a complete success, as it fails to sufficiently penetrate the cracks and if it is frequently used, in course of time the lime forms flakes, which act as an excellent harbour for insects. Prevention is simpler than cure, and this is done by keeping all perches away from the walls ; the pest is thus confined to the perches, which should be easily removable to facilitate inspection and the under parts examined. If the mite is present, a white frosted appearance is observable. A good painting with kerosene will kill the mites, but for a more effectual means of eradication a material called "Avanarius" can be strongly recommended, as it not only destroys the mites, but acts as a preventative. This material, which is chiefly used as a white ant exterminator, is also a splendid remedy for scaly leg in fowls. The legs should be well painted, and one application generally suffices.

DUCKS GOING WRONG.

I think it was Rankin, the father of the Pekin Duck Industry in America, who said, that "nothing but an axe would kill a duck." They are certainly hardier and much easier reared than chickens, if only proper feeding and shelter is given them. And yet complaints are continually being made from all parts of the State about ducks, especially young stock, going weak on the legs, or tumbling over on their backs and expiring without farther ado. The impression still exists that a running stream of water is one of the first essentials for duck raising. It is certainly very nice to have such an abundant water supply, but it can be done without, in fact, many ducks will hardly take any notice of swimming water, and others will not enter unless driven to it ; the natural aquatic instinct seems to have been bred out of many strains. We have very little water on the Farm here, and yet have had great success with ducks, having had but one death out of 100 hatched. None of them have had a swim, and not even a bath until 10 or 12 weeks old, but care is taken never to leave them without drinking water. No houses are used, but always plenty of shade ; the utmost cleanliness is exercised, the runs frequently cleaned, and any parts that smell at all are dug up. This is most frequent in the vicinity of the water tins, so they are removed to fresh ground, always shaded from the sun under empty cases. Kerosene tins are used to drink from, cut shallow for small ducklings, and deeper for larger birds, but care must be taken not to leave deep-cut tins for little ducklings, as they are liable to get drowned if unable to get out quickly. Coarse river sand and shell grit is always before the birds, and for young ones a small quantity of a finer grade is mixed with the food, which consists chiefly of greenstuff of whatever kind is available. Early in the season the ordinary growing crop is cut fine in the chaff-cutter ; later on boiled cabbage, then chopped green maize or lucerne, boiled tomatoes, and melons, and when all these fail, steamed lucerne chaff. This is mixed with some oilcake, boiled meat, add a little salt, and the whole mixed up with equal parts of bran and pollard, in quantities just sufficient to loosely bind the lot together, served out soft and damp, yet not sticky. Very little hard grain is given, and then only occasionally to adult birds ; if fed in this manner very little trouble will occur from leg weakness. We had three affected ; one died, but the other two were cured by cooping up in a shaded cool spot on sandy ground ; feed sparingly on mash, and add sulphate of iron to the drinking water.

THE COMPETITIONS.

The birds both at Subiaco and Narrogin are looking well ; the egg yield at the former is particularly good ; the Sunnyhurst pen still leads, with the other South Australian pen (Padman's) close up. The first eight pens so far are all white leghorns, and none of this variety are near the bottom of the list. The favourite breed is adding to its popularity, and next season is sure to bring a stronger demand than ever for this variety.

The duck yield is also remarkably good. Indian runners showing marked superiority over the Buff Orpingtons. The leading pen (Dusting's) is putting up a great record, the four birds having laid an average of 104 eggs per month for the seven months. It is very pleasing to note the success of this pen, as their owner is one of our most painstaking amateur fanciers, also one of the most successful exhibitors of Runners, and one who has been able to combine in his stock that most difficult of attainment, viz., the combination of superior excellence in both show and utility qualities.

The following are the records :—

EGG-LAYING COMPETITION.

NARROGIN MONTHLY RECORD.

The following are the results of the egg-laying competition at the State Farm, Narrogin, for the nine months ended with January last. There are still three months to run :—

	Breed.	Owner.	Total for Month.	Total to Date.
1.	Brown Leghorns ...	E. E. Ranford	131	1001
2.	Silver Wyandottes ...	A. M. Neitschke	98	944
3.	White Leghorns ...	Mrs. A. Bristow	83	937
4.	Do do ...	F. Piaggio	100	864
5.	Do do ...	C. W. Johnson	109	863
6.	Brown Leghorns ...	Mrs. R. A. Dusting...	113	862
7.	Buff Orpingtons ...	A. H. Hilton	77	839
8.	White Leghorns ...	Aveley Yard	123	815
9.	White Leghorns ...	Miss M. Parker	97	793
10.	Silver Wyandottes ...	Miss Buttsworth	87	765
11.	White Leghorns ...	A. F. Spencer	82	752
12.	Do. do. ...	J. Handley	84	740
13.	Black Orpingtons ...	Sparks & Binnington	74	722
14.	Brown Leghorns ...	J. D. Wilson	78	719
15.	White Leghorns ...	F. J. Williams	89	711
16.	Silver Wyandottes ...	G. W. G. Lizars	74	707
17.	R.C. Brown Leghorns ...	Adelaide Yards	72	695
18.	White Wyandottes ...	Mrs. S. J. Hood	65	672
19.	White Leghorns ...	R. G. Flynn	87	666
20.	Black Orpingtons ...	Perth Yards...	88	665
21.	Golden Wyandottes ...	W. J. Craig	81	664
22.	White Leghorn ...	J. E. Tull	93	660
23.	Do. do. ...	O. C. Rath	96	638
24.	R.C. Brown Leghorns ...	E. Krachler	62	604
25.	White Leghorns ...	G. Oneto	51	579
		Totals	2,193	18,920

SUBIACO MONTHLY RECORD—JANUARY.

[Commenced on July 1. To close on June 30, 1907.]

Fowls.

Six hens in each pen.

Owner and Breed.	1907. Jan.	Total for seven months.
1. Sunnyhurst (S.A.), *W. Leghorn	129	1,003
2. A. H. Padman (S.A.), *W. Leghorn	111	921
3. S. Craig, *W. Leghorn	118	881
4. J. D. Smith, *W. Leghorn	98	834
5. E. Garbett, W. Leghorn	112	830
6. Ericville Egg Farm, *W. Leghorn	107	820
7. Ryan Bros., *W. Leghorn	116	817
8. G. W. G. Lizars, *W. Leghorn	105	816
9. A. H. Padman (S.A.), *S. Wyandotte	105	811
10. Austin and Thomas, W. Leghorn	106	803
11. F. Whitfield, Brown Leghorn	113	801
12. J. R. Parkes, Brown Leghorn	117	800
13. E. Fitzgerald, W. Leghorn	101	794
14. W. J. Clarke, Brown Leghorn	93	792
15. E. Palmerston, W. Leghorn	107	785
16. Bungalow Farm, Brown Leghorn	97	784
17. Bon Accord, W. Leghorn	114	773
18. A. F. Farrant, Partridge Wyandotte	89	772
19. F. Piaggio, W. Leghorn	96	767
20. Mrs. McGree, *W. Leghorn	93	753
21. G. M. Buttsworth, *W. Leghorn	96	752
22. J. W. Buttsworth, *W. Leghorn	107	741
23. F. T. Rowe, *Buff Orpington	88	738
24. C. W. Johnson, *W. Leghorn	79	735
25. W. Snowden, Brown Leghorn	102	728
26. Adelaide Yard, W. Leghorn	94	717
27. A. Snell, *Brown Leghorn	88	709
28. Bungalow Farm, *W. Leghorn	79	709
29. F. Whitfield, *W. Leghorn	75	700
30. H. Jones, W. Leghorn	77	694
31. Mrs. Hughes, *R. C. B. Leghorn	102	684
32. C. Attwell, *S. Wyandotte	62	677
33. A. S. B. Craig, *W. Wyandotte	75	672
34. A. R. Keesing, Minorcas	85	670
35. E. Hutchinson, *Minorcas	78	663
36. W. Wade, W. Leghorn	99	659
37. J. White, Brown Leghorn	79	655
38. R. G. Flynn, W. Leghorn	73	654
39. O. K., *Black Orpington	79	650
40. L. Meatchem, *G. Wyandotte	61	645
41. Ericville Egg Farm, *Black Orpington	69	642
42. B. Jones, *S. Wyandotte	59	641
43. H. M. Kelly, *G. Wyandotte	93	640
44. C. R. Roberts, *W. Leghorn	76	633
45. Perth Yard, W. Leghorn	73	622
46. Geo. Bolger, *Black Orpington	75	619
47. F. Mason, W. Leghorn	76	598
48. E. A. Newton, W. Leghorn	87	597
49. W. Snowden, S. Wyandotte	71	597
50. J. W. Buttsworth, S. Wyandotte	62	592
51. Honnor and Forbes, R. C. W. Leghorn	72	591
52. Glen Donald Yard, G. Wyandotte	70	588

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* Male birds were placed in these pens on August 1.

FOWLS—*continued.*

Owner and Breed.	Jan.	Total for seven months.
53. C. L. Braddock, S. Wyandotte	54	587
54. R. G. Smith, W. Wyandotte	68	576
55. C. Crawley, B. Orpington	69	574
56. A. Coombs, S. Wyandotte	62	574
57. H. M. Kelly, *B. Orpington	66	537
58. J. S. Miller, S. Wyandotte	78	536
59. Mrs. McGree, W. Wyandotte	70	533
60. A. Savage, Minorca	68	530
61. Jas. Kirk, G. Wyandotte	66	510
62. H. H. Wegg, G. Wyandotte	70	505
63. J. E. Redman, S. Wyandotte	54	503
64. J. B. Pettit, S. Wyandotte	67	474
Total	5,480	43,998

DUCKS.

Four in each Pen.

1. R. A. Dusting, *Indian Runner	111	728
2. Austin and Thomas, *Indian Runner	102	666
3. Adelaide Poultry Yard, Indian Runner	97	619
4. F. T. Rowe, Indian Runner	87	612
5. Miss E. Parker, Indian Runner	80	604
6. A. Snell, *Indian Runner	69	587
7. C. E. Close, Indian Runner	72	575
8. F. D. Vincent, *Indian Runner	104	570
9. Ericville Egg Farm, *Buff Orpington	76	565
10. Mrs. L. Mellen, *Indian Runner	51	552
11. E. A. Newton, Indian Runner	16	552
12. Aveley Poultry Yard, Indian Runner	103	530
13. C. W. Johnson, *Indian Runner	90	522
14. Bon Accord, *Buff Orpington	41	521
15. G. Stead, *Indian Runner	45	519
16. J. R. Parkes, Indian Runner	65	498
17. Perth Poultry Yard, *Buff Orpington	23	495
18. S. Craig, Indian Runner	61	493
19. W. Snowden, *Buff Orpington	31	481
20. J. B. Pettit, Indian Runner	101	478
21. F. Piaggio, Buff Orpington	84	470
22. Sargenfri (S.A.), *Buff Orpington	6	387
Total	1,515	12,024

MR. JOHN STUART'S POULTRY YARDS.

I recently had the pleasure of making an inspection of Mr. John Stuart's yards at Cottesloe, and was much pleased with the quality of the young stock produced during the past breeding season. The stock, young and old, number about 750, and a very choice lot they are. Their owner has spared no expense in obtaining the best stock birds procurable, which were personally selected during his visits to England, where he called on the best breeders and made his selections. A great variety of breeds are kept, comprising the following :—Gold, Silver, White, and Silver-Pencilled

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* Male birds were placed in these pens on August 1, 1906.

Wyandottes, Barred and White Plymouth Rocks, Indian Game, Minorcas, Black and Buff Orpingtons, White and Brown Leghorns, and taken all round are undoubtedly the largest and best lot of high-class birds yet seen in this State.

Buff Orpingtons are still, for the third season, Mr. Stuart's leading line, and this year the pullets stand out as being of extra quality, a wonderfully even lot, grand rich even colour throughout, the obnoxious black or white plumage being non-existent. In Golden Wyandottes, a lovely cockerel catches the eye as standing out in a pen of seven or eight good ones, a wonderfully neat bird, smallish, but good type, neat comb, sharp and clear in markings throughout ; a choice lot of pullets are noticed, excelling in rich ground colour ; a lot of Silver-Pencilled have been bred, my choice falling to a cockerel, a grand sturdy typical young fellow, with a solid black breast, beautiful top, and clean and densely striped hackle. The pullets are as pretty a picture as a fancier wants to see, a real good even lot, still I doubt if there is one as good as I saw in last year's lot. The expensive pen of Barred Rocks has produced a choice lot of both cockerels and pullets ; one of the former I selected for the farm-breeding pens, which comes as a welcome addition, fresh blood being badly wanted in the Rocks of this State. A large number of White Plymouth Rocks have been bred. Mr. Stuart is very sweet on this breed, which he says are excellent layers. I could not help once more admiring the imported Indian Game, and among their progeny is a pullet, a real chip off the old block so far as type is concerned. Among the Minorcas are two lovely cockerels, the larger of the two has a splendid comb and the largest lobe on a cockerel yet seen here ; the smaller bird is not so big in lobe, but a beautiful, neat, clean cut youngster all over. In the Black Orpingtons pen are some pullets of rare type. A neat pen of White Leghorn pullets ; a good bodied bird stands out as a good one. The above are just a few that remain in my memory out of hundreds. There are a lot of chickens too young yet to criticise, but at the forthcoming shows the Wharncliffe yards will be well represented, and sure to carry off a lot of first prizes.

Since last year a great many improvements and fresh houses and runs have been constructed, the whole of the back land being now occupied and everything provided to make the stock as comfortable as possible. The different divisions are now so numerous that it takes the best part of an afternoon to get round them. A very large number of birds are kept on a comparatively small area, and the splendid condition the birds are in speaks well for the care bestowed on them. Mr. Stuart is fortunate in having an old and trusted hand who does not spare himself in tending to the stock from daybreak to dark, and after if required.

VEGETABLE GROWING.

By G. CHITTY BAKER.

(Continued.)

PARSLEY (*Petroselinum sativum*).

Parsley is one of the most useful plants grown in the kitchen garden, and yet it receives least attention. Any out-of-the-way corner seems to be good enough for it, while if properly cultivated it will give handsome returns Seed should be sown in drills fifteen inches apart, the plants being thinned out to stand twelve inches apart in the rows. Sowings to be made with first rains in March or April for winter use, and again in August or September for summer use. "Beauty of the Parterre" is a very handsome and distinct variety.

PARSNIP (*Pastinaca sativa*).

The cultivation notes for carrot are applicable to the parsnip. Sowings may be made in early autumn for use in spring, and again in September or early in October, but these must be used early, as they are liable to run to seed in the hot weather. Sow seed in drills eighteen inches apart, thinning out to stand six to eight inches, according to the size root required, thin roots being most in demand by private families. The two most popular kinds are the "Hollow Crown" and "Tender and True."

PEAS (*Pisum Sativum*).

Peas are essentially a winter crop in this State, very few districts being able to produce them later than Christmas. Hardly any other vegetable gives such a long list of varieties to select from as the pea. Any good garden loam seems to suit it, although it does best in a good sandy loam that has been well manured for a previous crop, a small application of superphosphate and potash being all that need be added.

The first sowing may be made early in April and continued right up to September, April and May for early sorts, June and July for main crop, August and September for late varieties. Market gardeners prefer the dwarf varieties, as it does away with the trouble of sticking. One of the best early dwarf kinds is the "American Wonder." In private gardens where sticks can be obtained much finer peas can be grown with heavier yields, while it is almost imperative that the very late kinds be kept off the ground, otherwise they are liable to attacks of mildew, which attacks even the dwarf kinds when allowed to lie over on the ground. Besides the ordinary pea there is the edible podded or sugar pea, and a new pea of recent introduction called the "Asparagus Pea." Dwarf kinds should be sown from one to two inches deep in rows eighteen inches to two feet apart, while the taller kinds should be in rows as far apart as they grow high, that is, those growing four feet high, the rows should be four feet apart, six feet between rows, and so on. All rows of early kinds should run north and south to have the full benefit of the sun. When this is done lettuce, early potatoes, radish, and beetroot may be planted between the rows of the taller kinds.

POTATOES (*Solanum tuberosum*).

Like the pea, the potatoe lists supply an endless variety to select from. Up to the present, however, it has not been determined which is really the best for any particular district. It, therefore, behoves each grower to try a few of the well-known varieties at first, and then experiment with other sorts. Mr. Berthoud, the manager of the Experimental Farm, Hamel, has published from time to time the results of potato tests extending over several years, and has thus been able to name certain varieties that succeeds best in his locality; still it does not follow that the potato doing well at Hamel will suit all districts. The following are the results of the more recent tests at Hamel:—The sets consisted of whole tubers, and were planted the first week in November, on light soil of medium quality, and fairly moist, planted 5 inches deep, 24 inches apart, in rows 2 feet 6 inches apart. Fertilisers, at the rate of 8cwt. to the acre, was well worked into the soil just before planting. The varieties, which were dug early in March and with the respective results, were as follows:—

Northern Star.—This potato, which created such a stir in England a year or two ago and brought almost fabulous amounts for a single tuber started off with a good growth, and at an early stage reached the height of 30 inches. The actual results, however, were rather disappointing; the tubers were white, round, mostly badly shaped and very rooty, a large proportion of them being quite unfit for market, being a great deal too small. It is a poor keeper, and, from a grower's point of view, not desirable. The yield was at the rate of 9 tons to the acre.

The Factor.—The growth of this very prolific potato was very healthy and vigorons, reaching a height of 3 feet. The tubers were white and oblong, nearly all of fair marketable size, and from some of the plants as many as 30 tubers were taken. The flesh was firm and sound. This potato is certainly one of the best sorts to cultivate. The yield was at the rate of 25 tons to the acre.

The Freeman.—Growth healthy; foliage smooth and wide, 30 inches high; tubers white, kidney shaped, medium size, and even; flesh firm and sound. Yield, at the rate of 8½ tons per acre.

Edward VII.—This is rather a stunted plant, not exceeding more than 2 feet in height, but very healthy. The tubers are oblong, with a yellow skin blotched with bright pink. Its appearance is handsome, but in size rather small; the flesh, however, is firm and sound. The crop yielded 8½ tons to the acre.

Evergood.—The growth of this potato was healthy and vigorous, the average height of the plants being 30 inches. The tubers were white, round, and numerous, of a fair marketable size; flesh fair; the keeping qualities, however, are somewhat doubtful. The yield averaged 11 tons to the acre.

The Sutton.—A dwarf variety, of healthy habits, not exceeding 18 inches. The tubers are round and a pale pink colour, but rather small; the flesh is sound and good. Yield small, averaging 6½ tons to the acre.

Up-to-Date.—This is another recently introduced potato, but somehow in this State it certainly does not do all it is alleged to do in England. The growth is vigorous, having a dark green foliage reaching a height of 30 inches. The tubers are white, kidney-shape, and, like the "Northern Star," a very large number of the tubers are small. It is a very poor keeper, and not a very desirable sort to cultivate. The yield averaged 10 tons to the acre.

Pink Blossom.—Growth strong and upright, having a pink flower. A distinct variety, tubers being white, oblong, large, and good; flesh firm and sound. Average yield, 10½ tons to the acre, while on another plot it gave a yield of 16 tons per acre.

Queen of the Veldt.—The growth of this plant is both robust and fine, strong stalk and upright habit. Tubers are large, oblong, and well-formed, smooth purple skin, and of fair market size. This is a late variety, and requires a good strong soil. Its keeping qualities are very doubtful, and the yield only averaged 5¼ tons per acre. On another plot, however, it yielded 13 tons per acre.

Dalmeny Radium.—Fair growth, two feet high. Flowering very freely, white blossoms. Tubers white, pipple-shaped and rather rough, sound and free from disease. Yield good, averaging 7¾ tons per acre. This potato grown on another plot gave much better results, the yield being at the rate of 19 tons per acre.

Vermont Gold Coin.—Weak growth, two feet high. Tubers white, oblong, fairly large with a rough skin; very few small ones. Good maincrop potato. Yield, 4 tons to the acre. This potato grown on another plot gave strong and healthy plants and yielded 18 tons per acre.

Norton Beauty—This plant has a very quick and healthy growth, with a wide and smooth foliage, lilac blossom, rather stunted growth, about 15 inches in height. Tubers of a pale pink colour, shape round, with bright eyes; nice uniform size, sound and free from disease. A very promising new and early kind. This potato should be tried by all growers who are desirous of a change. The yield was at the rate of 3 tons per acre. In another plot grown at the same time the yield averaged 11 tons per acre.

Eldorado.—Growth weak, foliage of a very sickly appearance, with an average height of plant, 12 inches. Tubers white, of oblong shape, but all very small. These potatoes was almost a failure, but this may have been caused by the soil conditions being unsuitable; a stiffer soil should give better results. Yield, 1 ton per acre. This potato grown in another plot did no better. It is not a desirable potato to grow.

Duchess of Norfolk.—The growth of this was of a free and upright nature, with dark green foliage. Tubers, coloured brown; nice even size; a fair second early kind. Yield, 5¼ tons per acre. On another plot the same potato gave a yield of 16 tons per acre.

Seedling 115.—Even and healthy growth; height, 30 inches. Tubers round shape, white skinned, with eyes slightly shaded with pink; nice even size throughout; a good sound potato, of late variety. Yield, 7 tons per acre.

Seedling No. 36—Free and tall growth. Tubers round, pink-coloured skin; eyes rather deeply set; medium size; fairly sound; late variety. Yield, 8¼ tons per acre.

Seedling No. 29.—Fair growth, reaching to 24 inches; stalks somewhat of a spreading habit. Tubers kidney-shaped, of a pale pink colour, rather small, but very sound. Yield, 6 tons per acre.

Money Maker.—This plant, although of very slow growth, was fairly healthy. Tubers of an oblong shape, with a pure white skin, medium size. Yield light, 3½ tons per acre. This when tried on a second plot did much better, giving a yield of 9 tons per acre.

Dalmeny Red.—Slow growth with sickly foliage, green stalks, and prone to making a second growth. Tubers very numerous, but rooty and badly shaped, of a pale pink colour. Not a desirable variety to cultivate. Yield, 5 tons per acre.

Pink Eye.—The sample received of this potato was a poor one. The growth, which was of an upright habit, was slow and weakly, very few tubers to the plant, which were only a medium size. Yield, very moderate.

Snowball.—This was a fair grower, but was not fully matured at time of digging; the tubers were fine and large. Although a late variety, it is a good table sort. Yield, 10 tons per acre.

Red River Triumph.—This was some American seed, and was not planted until the first week in January, and dug at the end of March. The tubers were round, large, and very even. It should be a good early variety, giving a yield of 19 tons per acre.

Early Rose.—American seed, sown 3rd January, matured 3rd April. This is also a fair early potato, well known, oblong shape, pale pink colour, of fair size. Yield, 8 tons per acre.

Clinton.—This was also American seed, planted and matured the same time as the Early Rose. A strong grower, tubers white, round, of even size; a good second early variety. Yield, 9 tons per acre.

The following five seedlings were planted on 5th January and dug on the 5th May. A complete manure was used at the rate of 6cwt. to the acre. The soil was good, moist lowlands.

Seedling No. 150.—The growth of these plants was moderate; tubers of neat shape and size; tubers bright purple, set close to stalk; a good second early. Yield, 6½ tons per acre.

Seedling No. 212.—Strong and well-growing variety, level and even, with thick stalks; tubers large, flat and round, of a deep reddish purple colour, set close to stalk. Yield, 9½ tons per acre.

Seedling No. 194.—This variety, which showed a strong and even growth, was hardly matured when dug. The tubers were very numerous, of an oblong or pebble shape, light purple in colour, set close to stalk. Yield, 9½ tons per acre.

Seedling No. 147.—These were also dug too early. The tubers were large and rough-shaped, set rather far from the stalks, purple colour. Yield, 7 tons per acre.

Seedling No. 190.—The growth of these plants was very healthy, vigorous, and fine, flowering early; tubers of neat shape and even size, smooth skin of a pinkish tint. Yield, 10 tons per acre.

NOTE.—The complete manure used in all these tests consisted of four parts of superphosphates, one part sulphate of ammonia, and one part of sulphate of potash.

Having decided the variety to go in for, seed should be bought from reliable seedsmen; tubers about one and a-half ounces each are the best size; these should be boxed for sprouting. The system of sprouting early seed potatoes has been generally acknowledged to be a great factor in the success of good cropping, and adopted by most of our up-to-date farmers. The sprouting of seed for late or main crops, however, is not generally practised, yet it is quite as important as for the early planting. The advantage of sprouting seed is without doubt very considerable; for instance, the writer planted two lots of Beauty of Hebron at the beginning of August, one-half the seed being sprouted, the other with dormant eyes. The weight of the tubers were uniform, being close on 2ozs. each. Those sprouted showed above the ground in seven days, while the others were three weeks. The plants were dug the first week in December; the yield from the sprouted seed averaged 11½ tons to the acre, while that from the unsprouted seed was 4½ tons. The test, however, while showing the value of the system, must not be taken too literally, as such an enormous difference is too much to expect in every case. The general rule is an increase of from 25 to 50 per cent.

In all districts where early potatoes are grown to any extent, the sprouting of the seed is an important feature. The plant grows quicker, and tubers are formed much earlier than is the case when seed is planted before first being allowed to sprout The sprouting is done by placing the tubers on dry shelves or floor, special boxes being used in which they are placed.

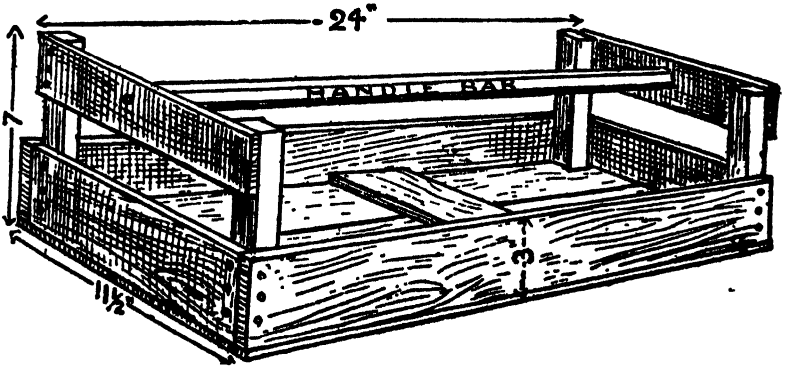

FIG. I.—Box for Sprouting Potatoes.

The boxes most generally used in England, Jersey, and Ayrshire, are here illustrated. Figure I. shows one with the proper measurements: two feet long, one foot wide, corner pieces seven inches long, with a slab across the ends to strengthen them; as these boxes, when filled, are piled one on top of the other, sometimes 25 to 30 being in one tier, it can be easily understood that the corner pieces, which carry all the weight, must be very strong, and these are made from 3 x 2 pine.

The box shown in Fig. II. is not quite as deep as the former, and is minus the cross-piece or handle-bar. This box is six inches longer and six inches wider, both hands being required to move them, while in the other one hand only is used. Boxes of the pattern of Fig. I. should not cost more than ninepence each, and sixpence for Fig. II. About 30 of the larger boxes are required to hold enough potatoes to plant one acre of ground and nearly twice that number of the smaller one, Fig. I. As these boxes will, with care, last very many years, the first cost is the only one; unless a trifle now and again may be required for repairs. The case described in Fig. II. is also used in the summer for gathering fruit from the orchard. A pile of these is placed at the foot of each tree, and when filled, the cart goes along gathering them up, stacking them one on top of the other, and taking them to the packing-house; by these means, soft and very ripe fruit are easily handled without bruising or injury of any sort. Good, sound, whole tubers of medium size from $1\frac{1}{4}$-inch to 2 inches in diameter being the best for boxing, the smaller ones proving unsatisfactory, while the only objection to the use of larger ones is the extra cost that is entailed for seed.

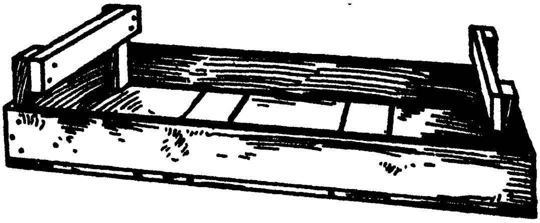

FIG. II.—Another style of box; this is also used for gathering fruit.

Tubers must never be cut before boxing, but in the case where very large ones are used it is advisable to pinch off all shoots but one that start from the crown of the potato. This will induce all or most of the other eyes to start. The tuber can then be divided at the time of planting, rubbing the cut part in dry wood ashes and planting at once, when little or no harm will result, unless the ground is very wet, when rot must be guarded against. The boxes when filled are stacked one on top of the other. They should be placed in some dry shed or room fairly well lighted; an ideal spot is in the stable of cow-house, boards being placed across the ceiling joists and the boxes on top. They must not be excluded from the light, for if left in the dark, long irregular shoots will be the result, too weakly to be of any value. Shoots when allowed to grow in a pit, heap, or dark places are usually white, brittle, slender in the stem, long-jointed, and easily detached from the tuber. With seed boxed and properly exposed to the light in a well-ventilated place, the shoots will generally be found to be of a bluish-green colour, thick in the stem, short pointed, very elastic and tough, and firmly attached to the tuber.

Figure III. hardly requires any explanation. It will be seen that when only one or two eyes are allowed to shoot the result is always more satisfactory.

CUTTING SEED POTATOES.

The evidence is accumulating that for seed purposes it is a mistake to cut potatoes into sett size. It has never been the custom in some districts to thus divide potatoes, but in others it has been the practice for generations. The idea in the past has been to prefer good sized tubers, and to divide them into two or three pieces, each with at least two eyes, on the principle that the large seed would be the most vigorous and yield the best crop, and also because it saved the weight of seed per acre. On the other hand, the dividing of a potato severs the fibres, which ramify in its substance, from each eyes, and thus weakens the initial growth—perhaps more than the original size of the potatoes strengthen the same. Again, the cut surfaces start bleeding, and there is a waste of sap, and an entry made for fungoid enemies, even where lime is dusted over them. It is being found that moderately sized seed planted whole give the most satisfactory results over even fairly-large seed, and where it takes a ton or over to plant an acre. A friend of the writer who "boxes" a lot of his seed finds that even small tubers if boxed a long time—as early as last July—and thoroughly "greened" in the intervening months gives the best results, and greater freedom from disease. It is rather curious that the small immature tubers do not disease so readily as the bigger ones, and out of a rotten heap one may pick many small potatoes quite untouched. Cutting is done, of course with the sole object of saving seed, and in the olden time, before the days of the potato disease, the eyes were actually gouged out and the "buds" only planted, but all experiments in these late years go to show that a whole fair sized sett gives the best all round results.

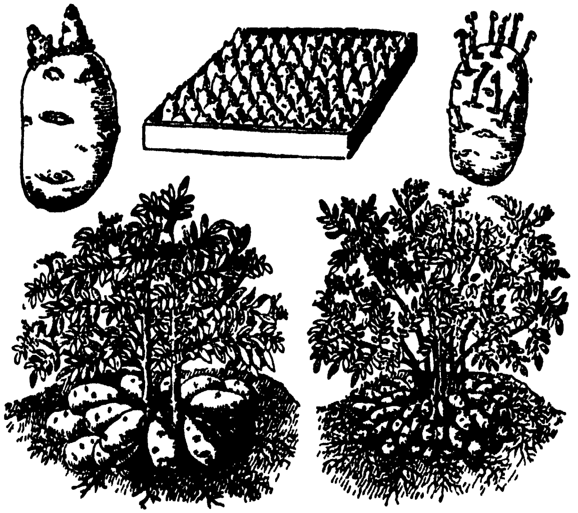

FIG III.—Seed potatoes and Resulting Crops Prepared "sett" (as in tray) and its crop on the left, weakened "sett" and its crop on the right

PLANTING.

When sprouted tubers are used planting is a little more tedious than when planted dormant. The trays are carted into the field and placed at convenient distances, one of the best devices I have seen is that illustrated in Fig. IV. It may be easily made from kerosene tins cut diagonally, each tin making two shovels, a piece of wire for a handle completing the device.

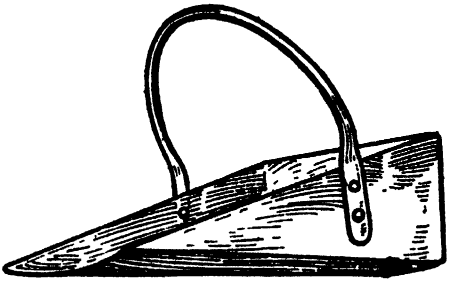

FIG. IV.—Shovel used to carry tubers from the boxes to the furrows.

The ground should be well prepared, and stable manure or fertilisers used must be well incorporated with the soil before planting. This is imperative for summer planting. The plan of sowing superphosphate, sulphate of ammonia, and sulphate of patash in the drills with the seed is injurious, and frequently results in the burning up of the young roots at this time of the year. The danger, however, is not so great when planting in August or September, as the rains distribute the fertilisers in the soil.

(To be continued.)

CORRESPONDENCE.

DESTRUCTION OF BRACKEN FERN.

A correspondent at Boyanup, writing on the subject, substantiates the opinion offered in a previous issue on the destruction of bracken fern, and states that—"I have completely destroyed bracken fern by cutting it down with a scythe, then burning it off; as quick as the young shoots came up and before the leaf unrolls I cut it again, continuing this as often as young shoots appear; one season is generally sufficient to kill them all out-right. I would also strongly recommend the planting of *paspalum dilatatum* immediately after burning, as this grass, when once it takes root, will soon kill any fern roots left in the ground. I have known this grass to kill out stinkwort as well. The advantage is that the ground need not be ploughed for the reception of the seed if sown before the first autumn rains.

PRESERVATIVE FOR CREAM.

A correspondent writes asking what preservative could be used to keep cream sweet. The matter being referred to the Central Board of Health, the Secretary replies as follows:—"The Central Board is aware of no preservative which, from a health point of view, could be added to cream. The keeping of this article is purely a matter of temperature, and if the cream, before commencing the journey to Perth, is cooled to as low a temperature as possible, and packed in ice or freezing mixture, or if neither of them are available, surround with wet cloths, it should keep sweet during transit."

LIME FOR LUCERNE.

A correspondent asks if air-slaked lime could be used on lucerne in places where lime is deficient in the soil. The matter being referred to the Field Officer, Mr. Wicken replies:—"The best way to apply lime to ground intended for lucerne is to spread it over the ground and plough in before sowing the crop. In cases where a crop is already sown it is best to wait until the first cutting is made, and then, after carting away, air-slaked lime may be spread over the ground and allowed to remain for a few days before irrigating."

WEST AUSTRALIAN LAMBS.

SUCCESSFUL IMPORTATION.

The Agent General for Western Australia (the Hon. C. H. Rason) informs us, says an English exchange, that the results of the first trial shipment of frozen lambs from Western Australia has been remarkably successful, the prices realised ranging from 6¼ to 6¾d. per lb. Mr. Rason explains that these high prices are partly due to the high quality of the meat, and the excellent condition in which it was carried from the Antipodes in the P. & O. Company's R.M.S. "Britannia," and partly to the fact that the market rates were ruling rather higher than usual.

In this connection it is interesting to learn from the Agent General for Western Australia that there is every probability of that State becoming one of Great Britain's chief sources of meat supply in the near future. Mr. Rason points out that in past years the meat importations from Australia and New Zealand have been of great advantage to the English masses, because it gave them the opportunity of buying good, wholesome meat at much lower prices than were charged for English and Scotch mutton. This advantage will be largely increased if Western Australia becomes a meat exporter on anything like an extensive scale. Heretofore Western Australia has played no part in this industry, but Mr. Rason is in receipt of an interesting and important statement from the Western Australian Minister for Agriculture (Mr. James Mitchell), in which that gentleman declares that "the frozen meat industry is bound to become a big thing in Western

Australia." He points out that in some of the Australian States they are now maintaining in cool storage lambs that were killed six months ago, and, when Western Australia has instituted a sufficiently extensive and efficient system of cool storage, the industry will also "boom" there.

A RIVAL TO NEW ZEALAND.

Mr. Mitchell goes on to say, "I look forward to the day when the value of our meat export will be equal to the value of our gold export. New Zealand to-day sends away £6,000,000 worth of frozen meat, and there is no reason why in time we should not reach similar figures in the State. We have just as great possibilities of raising prime lamb as New Zealand, and with our large areas of safe rainfall country, and our good climate, there is nothing extravagant in the contention that mutton and lamb raising should be as important an industry in Western Australia, as it is in Maoriland. And in my opinion there can be no doubt of the economic importance of building up a large meat-exporting industry. The over-seas market is practically unlimited, and we have the satisfaction of knowing that Western Australia, in addition to being a remarkably healthy stock country, is from a week to ten days nearer to the market of the Old World than the other portions of Australia. Competent sheep men who know something of the conditions of the frozen meat business, are quite as satisfied that Western Australia has an assured future in exploiting it."

The sheep farming industry is already apparently in a prosperous condition in Western Australia. The Minister for Agriculture mentions the experience of a farmer in that State who "from 800 ewes made £800."

ANTIDOTES FOR POISONED STOCK.

By E. A. Mann, Government Analyst.

I have received a number of letters from settlers in various parts of the country reporting the result of trials with these antidotes.

They have been uniformly successful whenever applied, and I thought it would be of interest to forward to you the attached extracts from their letters for publication in the Journal.

The report from Mr. Anketell, of the Public Works Department, is particularly valuable and interesting. There seems to be a good deal of evidence that these antidotes are being rather widely used in the country districts, either in the form supplied by me or as ordinary permanganate of potash and Condy's fluid. The last two are, of course, efficacious, but I do not think would act so readily or efficiently as the tabloids which I have had prepared, and which I should be glad to distribute to any other applicants.

Altogether forty-seven persons have applied for the antidote, and to some of these two or three consignments have been sent. Many of the settlers are not fond of letter writing, and it is probably on this account that it is rather difficult to get full reports as to the result of treatment.

It is hoped that the particulars sent herewith will induce a more extensive trial being undertaken.

EXTRACTS FROM REPORTS ON TREATMENT WITH ANTIDOTES.

Extract from letter of F. J. C. Minchin, Wagin, dated 1st June, 1906.

I had a young ewe and an eight months weaner poisoned. The ewe appeared the worse case. I gave each ten grains of permanganate, but gave no acid, which I understand is necessary. The lamb died, the ewe recovered.

Extract from letter of A. H. Ayliffe, Wagin, dated 10th July, 1906,

I did not have any occasion to use it until last week. I had two cows very badly poisoned, but I am very pleased to let you know that they both recovered after I gave them a couple of doses according to your directions, and in the morning they were both feeding. They have both quite recovered First dose 5 pm., symptoms decreased a little; gave half dose about 6 p.m., and that is all I gave them.

Extract from letter of Chas. Wade Wooroloo, dated 7th July, 1906.

The very night I received your antidote for poison my flock of goats (about 18) did not arrive home as usual. I at once suspected poisoning, so armed myself with some of the antidote and went out to look for them, but it being already dark I could not find them. The next morning, however, I found them all dead about a mile away from home. I am sorry I could not find them the night before, as it would have been a real test for your antidote.

I may say, however, that previous to this I had a goat that had eaten poison. This goat was very bad. I gave it some ordinary Condy's fluid and left it, expecting to find it dead in the morning, but it had considerably improved during the night, and was quite better by night time the next day.

Extracts from letters of C. W. Davey, Arthur River, dated 16th November, 1906, and 10th December, 1906.

1. I had occasion to use it this morning. I lost two heifers; they were pretty bad when first noticed, and died before dose could be given. The third one, a two-year old heifer, was not so bad, and I gave her three tabloids in 1½ pints of water. She was uneasy for about 1½ hours, lying down, sometimes full stretch; she got up and moved away feeding. I will watch her.

2. I am pleased to be able to report good results from the use of the poison antidote which you supplied.

The cattle got at the poison in the afternoon or evening about sunset. They were brought home, about two miles, and camped. Nothing wrong was noticed amongst them. In the morning about 7 o'clock they were being taken out of the paddock and three of them staggered and fell. Two of them got pretty bad before I could administer a dose, and as they were in good order, I stuck them and they bled well and I used the meat.

The third one, a two year-old heifer, I gave three tablets and it acted quickly; she seemed easier and laid down quietly for an hour or two and after that moved about quietly with the other cattle; the condition was the same all next day, and I thought all danger past, but the next day at about 9 a.m. she was stretched out with head thrown back, eyes staring and a little froth at the mouth.

I sat her up and gave her three tabloids and she improved immediately, laid there quietly for half-hour or so, then got up and moved about; did not feed that day, but picked at the grass next day and is now well.

Extract from letter of J. C. M. Fisher, Narrogin, dated 26th November, 1906.

As you wished me, I beg to inform you as to how I proved your antidote with sheep. In driving them to-day I noticed one commenced to tremble, first in the legs, and then the whole body; eventually fell over and swelled up, and seemed in great pain. I administered one dose and did not need to repeat it as I left it for half an hour, and when I returned she had joined the flock.

Copy of letter from Under Secretary for Public Works, dated 26th November, 1906.

In reply to your memo. of the 16th instant in regard to antidotes for stock poisoning, I have the honour to forward herewith copy of an official report by Mr. Anketell, in connection with his recent expedition referred to by you.

Report from Mr. Anketell, dated 22nd November, 1906.

On my recent expedition from Oakover River to Derby *via* Joanna Spring, I had occasion to cross a belt of country covered with poison plants extending for about 300 miles. I only discovered two varieties of poison plants —one I think is similar to the Dogwood Myaporum growing in the Northern Territory and commonly called Narrow Leaf Poison; the other is generally known as Broad Leaf Poison, the leaves of which are almost round in shape and not unlike the Native Poplar in colour. It grows from 3ft. to 25ft. high. I brought numerous samples of each to Perth, and Mr. Woodward, Director of W.A. Museum, is at present classifying them.

The Broad Leaf Poison plant was growing so thickly and luxuriantly that the camels continually snatched at it whilst on the march, with the result that, on the morning of the 29th August, four camels were paralysed in the limbs. Their mouths were wide open and the lower jaw had dropped to an alarming extent; they were groaning and appeared to be suffering acute pain. We made several attempts to get them on their feet, but they were incapable of using their limbs. I then instructed the head camel man to administer a drench of a solution of permanganate of potash (Condy's fluid) as recommended by Mr. E. A. Mann, Government Analyst. The quantity of liquid administered to each animal, for one dose, was about a gallon.

The camels showed decided signs of improvement one hour afterwards; the groaning ceased, and two or three of them commenced to chew their cud.

After being treated again, six hours later, they were able to stand up, and within four days were quite recovered.

I think it proved that this method of treatment, which is very easy of application, is a sure cure for camels affected by the Broad Leaf poison, a very small quantity of which will prove fatal unless an antidote be applied.

There is not the least doubt that these camels would have died from the effects of the poison had they not received immediate treatment, and I have no hesitation in saying that in future there should be no reason for losing camels whilst crossing country covered with poison plants, provided this antidote be available.

I also consider Mr. E. A. Mann deserves great credit for the trouble he has taken in discovering this effective remedy.

Extract from letters received from A. A. Phillips, Beaufort River, via Wagin, dated 17th January, 1907, and 8th February, 1907.

1st Letter.

I am in receipt of yours of the 14th inst., No. 88/7. Also I beg to acknowledge receipt of the antidote, for which I tender my sincere thanks.

With reference to my experience of York Road poison and the antidote, I have the honour to state that the sheep have generally dropped when we have been mustering them in the paddock prior to yarding them. That being so, I have always made it a practice of carrying a bottle with a pint of the mixture about with me on such occasions, and as soon as a sheep drops it is given a half-dose and sent up to the house for further treatment; that is, if it is not very bad. If it is a bad case, however, we tie it up and treat it where it is found.

[*] At first I lost several sheep through not knowing the exact dose necessary, although I have a copy of your directions to go by. I find that it is better to use one's discretion in the matter of doses. Latterly every sheep that has come under treatment I have cured, and I consider the antidote a proven success.

2nd Letter.

In response to your letter of the 30th ult., No. 175/7, requesting further information concerning the sheep I have treated with the antidote, I beg to state that I have treated 10 cases, the first three being failures through a misunderstanding, which I explained in my previous letter; the rest, with the exception of one, were a complete success, the fourth failure being an exceptionally violent case which was beyond cure, the stomach proving to be full of white froth when opened; so that I only saved six out of ten.

REPORT ON GRASS PLOTS.

By Percy G. Wicken.

Last season the Department of Agriculture distributed a quantity of grass seed among settlers for experimental purposes, and a number of reports as to the results have come to hand.

In the last issue of the Journal an interesting report was published of results obtained by Mr. C. Moran to the eastward of Wagin.

A few days ago Mr. P. Durack, of Belmont, near Wagin, called in and spoke well of the results obtained from some of the grasses. Mr. Durack was supplied with sufficient seed to sow one acre of a mixture of grass seeds, as follows:—

Cocksfoot	8lbs.
Timothy	6lbs.
Tall Fescue	8lbs.
Chicory	4lbs.
Tall Oat Grass	2lbs.
Wallaby Grass	5lbs.
Burnett	2lbs.
Rib Grass	1lb.
White Clover	1lb.
Hungarian Forage Grass	3lbs.
	40lbs.

Mr. Durack reports that the acre of mixed grasses have made a thick mat over the ground and look well, and have kept green all through the dry weather. The cocksfoot, rib grass, and sheep's burnett are likely to prove the best, and he hopes to plant out a further area of these grasses shortly.

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[*] **I might mention that the sheep had filled themselves with water, and consequently the effect of a dose as it was made up was practically *nil*. To make up for that, I have always mixed it a little stronger than directed since.**

Paspalum dilatatum has succeeded very well at Belmont Farm, and promises to prove a most valuable grass for the stockbreeder in that locality. Mr. Durack has ordered 1,000lbs. of seed from N.S.W., and intends to plant this grass on an extensive scale.

A fifty-acre paddock of lucerne has been sown on this farm, and up to the present the result has not been so good as from the grasses; but it forms a valuable change of food for the stock and is much appreciated on this account. As the lucerne obtains a better root-hold of the soil, it will probably yield better; under any circumstances a lucerne crop is never at its best the first year. Some months ago Mr. Durack obtained a small packet of Rhodes grass seed from a friend and planted it somewhat late in the season. The seed came up just before Christmas and the plants are now looking very well, and Mr. Durack intends to give it a further trial next year, but does not think it will come up to the same standard as *Paspalum dilatatum*, which so far he thinks is going to prove the best grass for the Wagin district. These remarks about *Paspalum dilatatum* were also borne out by the report of Mr. C. Moran in the last issue of the JOURNAL.

AGRICULTURAL BANK ACT AMENDMENTS.

To Western Australia is due the credit of being the first of the Australasian colonies to establish the Agricultural Bank system for the benefit of the settler on the land. The year 1894 saw the inauguration of an institution which, it may well be claimed, contributed in perhaps the greatest degree to the expansion of the agricultural industry. It is also noteworthy that the pioneer example of Western Australia is being followed in some of the sister States.

It is interesting to note that at the time responsible Government took place, in 1890, the whole area under cultivation in Western Australia was 73,408 acres, and for the next five years, namely in 1895, that area had only been increased by less than nine thousand acres, the total under crop being but 81,328 acres. It was about this period that the operations of the Bank began to directly and appreciably affect the agricultural industry, for during the succeeding five years the area under cultivation expanded more than twofold, there being 186,367 acres under culture in the year 1900; the succeeding five years ending in 1905 saw 327,391 acres so benefited, while last year the total reached 364,704 acres. So that the real advance of the industry may be said to have had its starting point with the proclamation of the 1894 Act, while the succeeding years of an expansion, which largely owed its stimulus to the provisions of the Bank Act, necessitated the enlargement and liberalisation of that measure itself.

Hence amendments to the original Act of 1894 were introduced in 1896, again in 1899, 1902, twice in 1904, and finally during the last session of Parliament. When the Act first became law, the funds aggregated £100,000. Under the Act as it is, which came into operation on 1st inst., one million sterling was made available to borrowers. The objects for which borrowers may receive advances have been very materially enlarged in their scope from former conditions, in order to keep pace with the expansion of the industry. Thus section 28 of the new Act reads as follows :—

Bank may make advances to Farmers and Cultivators.—See 1894, No. 21, s. 18.

28. (1.) Subject to the provisions of this Act, the Bank may, if the Trustees think fit, make advances on the prescribed security for:—

(a.) Ring-barking, clearing, fencing, draining, or water conservation; or

(b.) Discharging any mortgage already existing on any holding; or

(c.) The purchase of stock for breeding purposes.

(2.) Every application for an advance shall be made in the prescribed form, and shall contain such particulars as may be prescribed.

(3.) Advances may be made of an amount not exceeding three hundred pounds to the full value of the improvements proposed to be made.

(4.) Further advances may be made of an amount not exceeding two hundred pounds to one-half the value of additional improvements proposed to be made.

(5.) No advance shall be made under paragraph (b.) of subsection one to an amount exceeding three-fourths the value of the improvements already made on the holding.

(6.) At no time shall the advances to any one person exceed the sum of five hundred pounds, and no sum exceeding one hundred pounds shall be advanced to any one person for the purchase of stock.

A few words as to the scope and intention of the new Act : For the first five years of the currency of the loan interest will be charged on the amount advanced, at 5 per cent., but nothing more. After the expiration of the first five years, the repayment of the advance begins, and proceeds for 25 years, in half-yearly instalments, consisting partly of principle and partly interest. The instalments are repayable at the rate of 17s. 6d. for every £25 of the advance, with the exception of the last instalment. At the option of the borrower any advance may be repaid wholly or in part at any time, sooner than originally provided, and in larger instalments. Where an advance is made specifically to purchase stock, the amount is to be repaid within such time and by such instalments as the trustees approve. Every mortgagor shall, to the satisfaction of the trustees, keep all buildings and improvements in good repair ; but the land may not be let or the equity of redemption transferred without their consent. If the land of the intending borrower is well situated and fulfils the prescribed conditions, the Act entitles him to the full value advanced for the work to be done. It is but natural to assume that the wide liberalisation in the conditions applicable to borrowers will result in vastly increased settlement upon the land. And, at the present time when employment in the cities and towns has become as scarce as it undoubtedly is, it would be reasonable to urge upon selectors and land-holders generally to avail themselves of the ready means provided by the new Act for securing money on loan for the purpose of improving their holdings on the most improved methods, and affording employment to some at least of those deserving and capable men now fruitlessly seeking work in our large centres.

Messrs. A. R. Richardson and J. M. Hopkins have been appointed trustees of the institution to act with the manager, Mr. W. Paterson, and the esteem in which these gentlemen are publicly held throughout the State, together with their special knowledge of the various conditions obtaining in the agricultural areas, should be sufficient indication of the desire of the Government to further the interests of the settler on the soil.

It is also intended to appoint several additional inspectors as occasion arises, possibly for each district in the State, to deal with valuations. By this means any delay in dealing with applications will be obviated, and only a brief period need elapse between the time of applying for a loan and the grant to the borrower from the funds of the Agricultural Bank.

IS BARE-FALLOWING BEST?

WATER-HOLDING POWER AND FERTILITY.

In the wheat-belt, which falls within the zone of moderate to low rainfall, perhaps the most noticeable improvement in the farm practice is the adoption, on an increasing scale, of the system of fallowing (writes the agricultural expert of the Sydney *Daily Telegraph*). Abundant experience has now placed it beyond all question or argument that the man who fallows harvests not only cleaner crops, but heavier crops, than the man who harvests the same land year after year. Moreover, the fallow has been shown to ensure at least some crop even in the severest season, and we have the fact that in 1902—the worst year, probably, since agricultural operations in the west commenced—there was not a single recorded instance of total failure in cases where the crop had been sown on a well-worked fallow. In the face of this it is impossible not to say that fallowing is not fraught with great immediate benefit in dry or comparatively dry country. But the point arises as to whether that immediate benefit is or is not bought at the expense of the permanent productiveness of the soil.

Now, let us consider what we do when we fallow. First of all, if we take care to keep it bare, we clean the land of weeds. Secondly, we place it in a condition to absorb any rain that falls, and, if we keep the surface stirred to retain portion of that rain. Thirdly, through exposure to the processes of weathering, we bring about the release of new supplies of plant food, and in certain conditions secure an improvement of the mechanical or workable condition of the soil. As far as it goes that is well; but we have other things to take account of. We have got to remember that we farm in a country in which absolutely the very most must be made of moisture. Our first concern, therefore, should obviously be with those things which condition in a soil the capacity for holding moisture, or, in other words, resisting drought. Now, generally speaking, the drought-resistant capacity of a soil is dependent upon its humus content. A soil that is rich in humus will hold moisture even under very trying conditions;

on the other hand, a soil that is poor in humus will dry out at the first pinch of the season. Furthermore, the evaporation of moisture from such a soil in times of extreme heat may exert a cooling action upon it. That is, it may hinder the soil from becoming so hot that the surface roots may be destroyed. Hilgard, the greatest of soil authorities, has called attention to the especial importance of this consideration in arid country, where rains fall chiefly in winter, to be succeeded by long-continued dry weather, and where the success of crops is dependent upon the power of the soil to husband the supply of water within it until such time as the crop has completed its term of growth. It has been observed in California by Hilgard that a very small difference in the water-holding—i.e., the hygroscopic—power of soils will manifest itself in adjacent plots of grain by the total burn-off of the crop in the one case, and the maintenance of growth in others. "In critical cases the presence of a single per cent. of hygroscopic moisture may be a saving clause to prevent the roots of the crops from being overcome at a time of scorching heat."

But enhancement of water-holding capacity is not the only service which decaying vegetable and animal matter, designated humus, renders the soil. It also acts, to a large extent, as the custodian of that all-important and expensive plant ingredient, nitrogen. The supplies of nitrogen in a soil have therefore something of a corresponding relation to the supplies of humus. How now does the practice of bare-fallowing affect the supplies of humus? First of all, let us understand that the decline in productive power in a field continuously cropped for grain is caused chiefly by the loss of nitrogen. There is the nitrogen which is directly utilised by the crop and the further and greater loss through the destructon of the humus through the action of the elements, for we are given to believe that when nitrogen is combined with the humus it is in a stable form, but as soon as the humus is broken down the nitrogen thus liberated is converted into gaseous and other forms, which are readily lost. This loss is great enough in land which is continuously cropped; but on bare fallowed land it is greater, very much greater. On the fallowed land vitrification proceeds freely. The following crop is increased, because under the influence of weathering a larger proportion of humus is broken down, which furnishes available nitrogen for the growth of the plants. The trouble, however, is that much more nitrogen is liberated than the crop can use, and what is not used is lost. Indeed, it has been proved that in order to obtain available nitrogen for a wheat crop, on land that has been bare-fallowed, about five times more than is required is rendered available and lost, and the richer the soil the greater the oxidation of the humus, and therefore the greater the loss.

We get then to this position, that while the practice of bare-fallowing undoubtedly confers immediate benefit to the cultivator, inasmuch as it ensures him larger returns, it would appear to be doing so at the cost of the ultimate impoverishment of the soil. As do superphosphates when used as the only manure, so apparently does the bare-fallow act like a whip to the tired horse—it puts no new strength into him, but it enables you to get more out of him for the time being. While bare-fallowing frees more plant food, it favours its greater waste. While it places the soil in a more absorbent condition, it weakens those qualities which enable the soil to retain the moisture absorbed until ultimately there might be the same unresponsiveness and the same decrease of return from bare-fallowed land as from land "worn out" by continuous cropping. Although this exhaustion may not be felt in our wheat lands for some time, still, if the conditions favouring the destruction of humus and the consequent loss of nitrogen are correctly stated, it must become sooner or later a matter of very serious concern.

The remedy, of course, is a rotation of crops—so planned as to keep the soil well supplied with organic matter and the elements necessary to fertility. At the Bathurst farm, Mr. Peacock has shown to what advantage farmers may alternate rape with their wheat, and feed it off to their sheep. In the districts comprising the western wheat belt, however, the severer conditions make the planting of an effective rotation one of much difficulty. Nevertheless it fortunately is a matter which is at present receiving a deal of earnest attention by Mr. Sutton at the Cowra and Coolabah Experimental Farms. His aim is to get a plant which the wheat-grower can sow in his fallow and give him good green feed for stock through the summer months, when what grass there may be is dry and seeds are bad. He has tried rape two years running at Coolabah, and got an immense yield of fodder, but the winters had undeniably been good ones, and, moreover, the crop did not carry the stock on beyond the end of October. At Cowra this last year he succeeded in raising a splendid crop of vetches, which was an object of much interest to visiting farmers. The vetches were beautifully green at the end of November, and looked good enough to graze 10 or 12 sheep to the acre pretty well to the end of the year. Growers who have discussed the matter, however, seem to think that the ideal crop is one which would carry them on further still—say, into February. Whether a plant can be got which will do this satisfactorily has yet to be proved, though Mr. Sutton has a legume in hand which he is hopeful may fill the bill. Obviously legumes, if they can be got, are preferable because of their power of restoring nitrogen to the soil. At Cowra Mr. Sutton has been ploughing his green stuff in simply because he has no sheep at command to which he could feed it off. The improvement thus effected in the mechanical condition of the soil has been most marked. A similar result was obtained at Coolabah, where, however, the rape was fed off to sheep. The greater ease with which it could be ploughed than land upon which no rape had been was of itself testimony to its better condition.

The idea, of course, is that the cover crop should always be fed off to stock, so that there might be a direct return to the farmer from this source, while animal manure as well as the residues of the crop woud be available to plough in for the improvement of the land. The chief difficulty is to get cover crops that will meet the requirements at once as fodder and as soil renovators, and still will fit into a rotation conveniently manageable by the average farmer. How far we may be able to go in this direction in the drier districts must be left for experience to decide, but there is no reason to believe that some rotation system will not be found workable over a very considerable area where the less developed and less profitable system is now alone relied upon.

THE LAND LAWS.

THE NEW ACT.

SUMMARY OF PROVISIONS.

LIMITATION OF AREAS.

On the 1st inst. the Land Act Amendment Act, 1906, came into force. This Act is undoubtedly the most important piece of land legislation that has been introduced since the Land Act of 1898. For 11 years prior to this latter date all Crown lands were disposed of under the provisions of the Land Regulations of 1887. The first printed Land Regulations were issued on January 28, 1841. These were followed by the regulations of 1843, and supplemented by regulations issued in 1851, when pastoral and tillage leases were first introduced. In 1860 new regulations were gazetted, and under these the price of rural land was first fixed at 10s. an acre, and provision made for dealing with mineral and timber lands. Thirteen years after Mr. Malcolm Fraser drafted a fresh code of regulations, which, *inter alia,* provided for the appointment of a Commissioner of Crown Lands. This title was retained by the head of the department of Lands and Surveys until the Land Act of 1898, when it was changed for Minister for Lands. In 1887 Mr. John Forrest prepared a new set of regulations, providing for an extension of period over which leases of lands could be held from 10 to 20 years, and the reduction of the rent to 6d. an acre. These regulations also provided for a difference of conditions as between residence and non-residence, and in 1893 the Homestead Act was passed providing for free homestead farms.

Generally speaking, the 1898 Land Act closely followed the lines laid down in the regulations of 1887, and was, in many respects, a good measure, but it had two very weak spots. The first was that the limitation of area which one person could select was very difficult to determine, and the second was that there was no provision to compel the selector of conditional purchase land to cultivate his block for the first 10 years after selection. The result has been that since that time some very large estates have been built up, and a great amount of land selected for purely speculative purposes.

Under the original Act a man could select as follows :—

160 acres homestead farm.
1,000 acres under sec. 55 (C.P. with residence).
1,000 acres under sec. 56 (C.P. without residence).
1,000 acres under sec. 57 (C.P. direct purchase).
3,000 acres under sec. 68 as second-class grazing lease, or 5,000 third-class grazing lease, or 4,000 acres as second and third class mixed.
10,000 acres under sec. 71 as poison lands—

making a possible total of 17,160 acres.

The conditions under which these lands were parted with were most liberal. The homestead farm could be secured for a payment of £2 10s., including Crown grant fee, on the completion of certain improvement conditions. The ordinary conditional purchase land was selected generally at 10s. an acre, payable in 40 half-yearly instalments, and the improvement conditions were a tenth of the fencing erected within two years from the date of the lease, the whole of the exterior fencing within five years, and within 10 years an amount equal to the full purchase money spent in prescribed improvements. In the case of C.P. land selected under sec. 56, double improvements were required in lieu of residence.

With regard to the grazing leases, the purchase money was payable in 60 half-yearly instalments, and within 15 years an amount equal to the full purchase money had to be expended in *bonâ fide* improvements the fencing conditions being the same as for ordinary C.P. lands. The minimum price for second-class grazing land was fixed at 6s. 3d., and for third-class at 3s. 9d. an acre. The poison lands were parted with at 1s. an acre, and during the period of the lease the poison had to be eradicated two years before the expiry of the lease.

As a matter of fact, however, the grazing lease and poison lease sections of the Act have been suspended for the past three years.

Under such liberal conditions as these, it is easy to understand how large areas of land could be selected and held for years without any improvement being effected on them.

The Land Act of 1906, however, effectually blocks the tactics of the speculator and the land-hungry individual. Sections 24 and 28 embody the most important features of the Act. The first provides for the rural lands of the State being divided into two classes, viz., cultivable land and grazing land. The maximum area of cultivable land selectable by any one person is definitely fixed at 2,000 acres, and the maximum area of grazing land is fixed at 5,000 acres. If it be desired to select cultivable and grazing land mixed, five acres of grazing land is deemed to be the equivalent of two acres of cultivable land. That is to say, a man may select 2,000 acres of cultivable land, or 5,000 acres of grazing land, or, say, 1,000 acres of culivable land and 2,500 acres of grazing land. In addition, if he be married, his wife is eligible to select another 1,000 acres of cultivable land or its equivalent in grazing land. This definitely fixes the question of maximum area selectable, exclusive of homestead farms, and that area which pastoral lessees outside the South-Western Division are entitled to select under section 62 of the principal Act. There will no longer be a doubt as to whether a man can select 1,000 acres under each of the sections 55, 56, and 57, as in the past. Under no circumstances, with the exceptions above stated, can any person, or company, or corporation, secure a greater area of rural land than 2,000 acres of cultivable land or 5,000 acres of grazing land.

This section 24 is in itself a splendid step forward, but without section 28 the way would still be open to the speculator, as by dummying he would be able to secure large areas of land and hold them for years unimproved. Section 28, however, introduces the great principle of progressive improvements, which provides that every holder of conditional purchase lands shall spend in prescribed improvements every two years from the date of the approval of his lease to the tenth year an amount equal to one-fifth of the total purchase money. If the Land Act of 1898 had contained this provision, there would have been hundreds of thousands more acres of land under cultivation than there is at the present time. This can readily be seen by taking the case of a holder of 1,000 acres of C.P. land under the 1898 Act, and the case of the holder of 1,000 acres of cultivable land under the 1906 Act, assuming that the price in each case is 10s. an acre.

Under the 1898 Act, a tenth of the fencing has to be completed within two years from the date of approval of the lease, and within five years the whole of the fencing erected, and within ten years improvements to the value of £500 effected. That is to say, the holder need not spend a penny in cultivating his land for ten years.

Now, take the case of the man who holds his land under the 1906 Act :—Within two years he must spend in improvements £100 ; four years, £200 ; six years, £300 ; eight years, £400 ; ten years, £500. Also, within five years he must fence in half the land, and the whole of it within ten years ; but if the fence be sheep and cattle proof half the value is deemed part of the improvements, and if a rabbit or dog-proof exterior fence is erected the Minister may allow two-thirds of the value to be part of the improvements. If the holder of C.P. land does not reside on his land, or his parent, wife, or child over 16 does not perform the residence condition, he has to do 50 per cent. extra improvements. It is, therefore, pretty certain that the cheerful individuals who so enthusiastically selected large areas of land in the names of their children, brothers, cousins, and aunts will have their ardour somewhat damped when they realise that to hold land under the new conditions it will be necessary for them to spend every two years an amount equal to a fifth of the full purchase money. It will also tend to check the tendency of some selectors of taking up a larger area of land than they can possibly utilise. The Minister for Lands is to be heartily congratulated on having introduced this great feature into our land legislation, the importance of which cannot be over-estimated. The only regret is that it was not done years ago, as, unfortunately, it cannot be made retrospective.

Another important provision in this Act is that repealing the poison lease sections. It has long been recognised that the fact of land, otherwise first-class, containing a few patches of poison, was not sufficient to justify the State in parting with it for 1s. an acre, more especially as it is generally believed by those who have had expeience that if systematically dealt with the poison can be eradicated comparatively cheaply. A subsection is added to this section (39), giving the Minister power to grant his certificate for the issue of the grant of the fee simple under a poison lease granted under the principal Act or land regulations, if he be satisfied that the conditions of the lease have been substantially fulfilled, notwithstanding that the poison plants were not eradicated for any prescribed period prior to the expiration of the lease. This was introduced, it is understood, for the purpose of dealing with two special cases, where the leases had been acquired during the latter term of the period of the leases, and, owing to the short time available in which to carry out the necessary conditions, it was found, despite the fact that a very large sum of money was expended in the attempt, that the conditions could not be strictly complied with.

A provision which should also be appreciated is the simplification of the improvement conditions required to be performed on homestead farms (section 44). The new conditions are :

> "Within two years from date of occupation certificate a sum equal to 4s. an acre to be spent.
>
> "Within five years from the same date a total expenditure of not less than 10s. an acre ; and
>
> "Within seven years a sum equal to 14s. an acre, not more than £30 of which to be applied towards the erection of the necessary house."

Section 42 also provides that residence on a homestead farm may be performed on fee simple or conditional purchase land held by the selector within 20 miles of the farm, either by himself, parent, wife, or child over 16 years.

The new Act also amends the old boundaries of the various land divisions by creating a new one, the "Central," and enlarging the South-Western division by extending it from the Murchison River on the north, thence south-easterly to the No. 1 rabbit-proof fence, thence along the fence to the seashore. The rent for pastoral leases in the Central division (the greater portion of which was previously included in the Eastern division) has been fixed at 10s. a 1,000 acres ; in the Eastern division the rent is raised to an all-round figure of 5s. a 1,000 acres, in lieu of, as formerly, 2s. 6d. a 1,000 acres, for the first seven years, and 5s. a 1,000 acres for the remainder of the term ; and in the Eucla division the rent has been reduced to 3s. a thousand acres, probably on account of the havoc played by the rabbits in that locality.

Section 65 also includes a somewhat important amendment in connection with claims for compensation by pastoral lessees against selectors within their leases. The Minister may now appoint either the resident magistrates as referee, " or such other officer or disinterested person " as he may think fit. This has possibly been done to enable the Minister to appoint a departmental expert in such cases where it is considered that the resident magistrate has not the practical experience necessary to fit him to fairly adjudicate.

Sections 70 to 73 deal with special settlement lands. Under this portion of the Act the Governor may set aside any Crown lands, after being first subdivided, as special settlement lands, and these may be selected either under ordinary conditional purchase conditions, or the selector may enter into a contract to grub and clear portions of his block, and ringbark and cut down all the scrub on the remainder of the lot and to fence the same in for an agreed sum to be paid by the Minister as the work proceeds. After completion of the work the selector has the option of applying for the land as conditional purchase land at the price fixed as the selling price in the contract which will presumably include the cost of the improvements plus interest. These lands may, if the Governor think fit, be selectable only by certain classes of selectors, the landless for instance.

Another important feature of the Act is that providing for the conversion of residential leases into workingmen's blocks. The residential lease system was introduced by Mr. Throssell when Minister for Lands, and has been applied very largely to the goldfields towns. Under this system it is not possible to secure the freehold of the block. Apparently this fact has caused a good deal of discontent among residential lease-holders, as strenuous efforts have been made from time to time during the past few years by these people to secure the right to the freehold. The present Act provides that the holder of a residential lease may convert his lot into a workingman's block, and be credited with the time during which he has held it as a residential lease. In any case, however, provision is made for the holder of a workingman's block obtaining the Crown grant any time after the expiry of two years from the date he has selected it as a residential lease or a workingman's block, provided the improvements have been effected, and full purchase money and fees paid.

The last portion of the Act, from section 74, deals with the question of lodging of caveats against conditional purchase lands in the same way as fee simple lands under the Transfer of Land Act.

A new feature in regard to the administrative work of the Lands Department is introduced by the inclusion in the Act of provision for the appointment of District Land Commissioners and District Land Boards with a view of expediting the work of the department.

There is a number of other amendments included in the Act, but they are not of sufficient importance to the ordinary public to warrant special reference.

The present Minister for Lands is to be congratulated on having drafted and successfully fathered this most important measure.

GOVERNMENT LABOUR BUREAU.

JANUARY REPORT.

The following is the report of the Superintendent of the Labour Bureau for the month of January, 1907 :—

PERTH.

Registrations.—The total number of men who called during the month in search of work was 837. The trades or occupations were as follows :—Labourers, 244 ; handymen, 73 ; handy lads, 62 ; farm hands, 56 ; carpenters, 48 ; cooks, 34 ; bushmen, 29 ; miners, 29 ; drivers, 20 ; yardmen, 19 ; gardeners, 17 ; painters, 17 ; engine-drivers, 15 ; farm lads, 12 ; grooms, 1 ; bakers, 7 ; blacksmiths, bricklayers, butchers, firemen and kitchenmen, 6 of each ; hotel hands, 5 ; plasterers, 5 ; caretakers, electricians, fitters, mill hands, orchardists, orderlies, station hands and survey hands, 4 of each ; and 72 miscellaneous.

Engagements.—The engagements for the month numbered 292. The classification of work found was as follows :—Labourers, 92 ; bushmen, 65 ; farm hands, 18 ; handy lads, 18 ; sawmill hands, 14 ; cooks, 10 ; gardeners, 9 ; handy men, 9 ; yardmen, 7 ; miners, 5 ; horse-drivers, 4 ; woodcutters. 4; boys for farms, carpenters, engine-drivers, hotel hands, kitchen lads, married couples, orderlies and survey hands, 2 of each; and 21 miscellaneous.

KALGOORLIE.

Registrations.—The applicants for work numbered 54. The classification was as follows :—Handy men, 16; labourers, 14; miners, 7; cooks, 3; carpenters, engine-drivers, and engineers, 2 of each; fitters, firemen, drivers, blacksmiths, grooms, waiters, yardmen, and butchers, 1 of each.

Engagements.—There were 12 engagements, viz. :—Miners, 5; labourers, 2; handy men, blacksmith, yardmen, barmen, and fitters, 1 of each.

The female servants who called numbered 13, classified as follows :—Generals, 6; waitresses, 4; cooks, 2; housemaid, 1.

There was 1 engagement.

NORTHAM.

Registrations.—There were 44 applicants for work, classified as follows :—Handy men, 17; labourers, 15; farm hands, 5; cooks, 3; grocer, yardman, bricklayer and general servant, 1 of each.

Engagements.—The engagements for the month numbered 4, viz :—Labourer, handy man, farm hand and general servant, 1 of each.

WOMEN'S BRANCH, PERTH.

Registrations.—There were in connection with this branch 144 registrations, a decrase of 19 compared with the corresponding month of last year. The classification was as follows :—Laundress-charwomen, 29; housemaids, 25; generals, 23; cooks, 18; light generals, 11; nursemaids, 10; lady-helps, 6; housekeepers, 5; waitresses, 4; married couples, 4; useful girls, 3; nurse-needlewomen, 3; and 3 miscellaneous.

Engagements.—The engagements numbered 80, which is the same number as for January last year. The classification of work found is as follows :—Laundress-charwomen, 33; generals, 19; light generals, 6; useful girls, 5; cook-laundresses, 3; cooks, 3; nurses, nursery housemaids and lady-helps, 2 of each; and 5 miscellaneous.

GENERAL REMARKS.

The number of applications for work during the month at the central office, Perth, was 837, an exactly similar total to the month of January last year. As is generally the case, the January total is greater than other months, owing to the fact that a large number of men leave their situations in the country for the purpose of enjoying the Christmas and New Year holidays in Perth. About 50 per cent. of the total number of callers would be included in this category. Many of them become stranded, and find it difficult to return to where they came from. There were 70 men granted free railway passes in order to proceed to the work supplied by Government Departments, and in addition 78 passes were issued at the bureau, total, 148. The engagements totalled 292, being 86 in excess of that for the month of January last year. There were 196 engagements for country districts and 96 for town. Private employers engaged 222, and the Government Departments 70; this latter total includes 30 men for ringbarking in the Warren district, and 25 men for railway work.

GARDEN NOTES FOR MARCH.

By Percy G. Wicken.

Now that the worst of the hot weather is over a start should be made to clean up the garden, preparatory to sowing fresh seeds as soon as the first of the wet weather sets in. Rake up all the rubbish, pull up all dead and useless plants and stack together all that are moist, so that they will rot; they will soon decay and will come in later on for manure. If the heap smells offensive it can be covered with a little dry earth or gypsum, which will soon take away any smell. Every opportunity should now be taken advantage of to prepare the land for future sowing, as, when the weather becomes wet, you will not have the same opportunities as you have now. Do not be afraid to go too deep. If trenching can be carried out at least 2ft. deep, so much the better, but the subsoil need not be brought to the surface. If any drains are to be put in, now is the time, so that they can be filled in again before the rain. If the land is trenched, stable manure should be mixed with the soil, the whole depth broken up, and not merely on the surface; you want to encourage the roots to go down. Keep the cultivators going in the orchard and on fallow land so as to keep the surface well stirred. Harvest carefully, and put away to dry any seeds that may be ripe. Dry all melon and pumpkin seeds, and be careful not to get the varieties mixed up.

Asparagus.—A bed of sufficient size to meet requirements should be prepared in good time for planting early in the season. It should be trenched 2ft. deep, keeping the surface soil on top. Dig in, while trenching, a liberal supply of well-rotted farm yard manure, and mix well with the soil. The soil should be left in a rough condition, as it will have a chance of sweetening before sowing time.

Beans (French).—Except in a few of the warmer localities this crop will be nearly over. In hot parts, where there is no danger of frost, a few rows may be sown.

Beans (Broad).—This vegetable likes a heavy clay loam soil, although it will grow and bear in most soils. It should not be sown before the end of the month, and the ground requires to be well broken up, and if poor apply plenty of stable manure. Do not apply nitrogenous manures. Bone-dust, superphosphate, and potash are the manures which should be used. Sow in rows 3ft. apart and about 5 inches in the rows.

Beet (Red).—A few rows may be sown. Thin out the plants that are coming up from previous sowings.

Borecole or Kale.—This is a plant which some like as a vegetable, and others do not think it worth growing. Seed may be sown the same as cabbages, and plants put out. It yields a large amount of green stuff, which can be used for the table or for stock.

Cabbage.—Plenty of plants should be available from the seed beds, and they should be planted out as soon as the ground is moist enough. Plant in rows 3ft. apart and 2ft. in the rows.

Carrots.—Plant out a supply for the winter. The drills should be 18in. apart. The seed takes some time to come up, and the weeds want looking after.

Sweet Potatoes should now be ready to dig. They can be stored, and if kept in dry sand will keep good throughout the winter.

Tomatoes are getting scarce; destroy, by burning or boiling, all diseased fruits, to prevent the spread of disease.

Pumpkins and Melons.—Store away for future use all those that are sound, they will be useful later on; any dry shed will do to store them in.

Peas.—In the cooler districts, a few rows of peas may be sown. Work the ground well, and apply plenty of potash and manures.

Turnips.—Prepare as much land as you require for this crop, and as soon as the rain comes sow full crops. There are a great number of varieties to choose from in both white, yellow, and Swede varieties.

Farm.—Most of the wheat crop is now winnowed and either sold or stored away until it suits the grower to sell it. The price having reached a low level, many growers will no doubt hold their wheat as long as they possibly can in the hope of increased prices. Where it is possible to do so it will be found more profitable to turn the wheat into pork than to sell at the present rates. Chaffcutting will be one of the principal operations at the present time, as most settlers try to get their chaff cut and carted before the wet weather sets in or seeding operations start. As soon as it is finished with, all harvesting machinery should be oiled and put away so that it is ready for use at any time. Rust and exposure do more harm to farm implements than actual use. Seed drills should be looked to so that they are ready for use when required, and duplicates obtained for any parts likely to break. It is a serious loss if the drill has to stand idle during the sowing season. As soon as the first rain falls some barley and tares should be sown to provide green feed during the winter. Everything should be got in readiness to sow the wheat crop early in the season. In sowing wheat the late or slow growing varieties should be sown first and the quicker growing varieties later on. If early ripening varieties are sown too early in the season they may become ripe before it is possible to harvest them, as the ground is too soft to carry the harvesting machinery. Before sowing, all grain should be pickled in a solution of bluestone as a preventative against smut. Dissolve 1lb. of bluestone in 5 gallons of water and dip the wheat in the solution for about 10 minutes, taking care that the solution penetrates all through the bag so as to reach every grain.

RAINFALL FOR THE YEAR 1906.

The rainfall was, on the whole, about the same as the average for previous years throughout South-Western districts, slightly below in the North-West, and slightly above in the Kimberleys. The manner of its distribution may be seen from the following brief remarks for each month :—

January.—Patchy, slightly above normal in the South-West and Goldfields districts. Light in the Tropics and North-West.

February.—Considerably heavier than usual on the Coolgardie Fields and in the extreme South. Elsewhere light.

March.—Below the average throughout.

April.—Very light throughout.

May.—Slightly above normal between the latitude of Perth and the South coast. Elsewhere very light.

June.—Heavy in the extreme South-West (between Perth, Cape Leeuwin, and Albany), also in the North-West between Marble Bar and the coast. Elsewhere below average.

July.—Heavier than usual throughout the Central and Southern agricultural districts and on the Goldfields. Elsewhere about normal.

August.—Rather less than usual in the extreme South-West coastal districts, but elsewhere, except in the extreme North and North-East, it was very heavy.

September.—About an inch in excess of the average in South-West coastal districts, diminishing to about normal on the eastern boundary of the South-Western division. Elsewhere very light, except in the East Kimberley district, where 431 points were recorded at Turkey Creek, and 195 at Hall's Creek. This is the earliest heavy rain on record in that district.

October.—Rather below normal in South-Western districts, slightly above in East Kimberley, mostly *nil* or very light elsewhere. A few light showers were, for the first time on record in October, experienced on the North-West coast.

November.—Above the average in the extreme North-East. Also moderately heavy at scattered places on the Goldfields, and in the South-East, but otherwise very light.

December.—One of the earliest and most severe wet seasons in the Kimberley district. Light south of the Tropics, except in the extreme South, where it was about, and in some cases slightly above, the normal.

Observatory,
Perth, 29th January, 1907.

W. E. COOKE,
Government Astronomer.

RAINFALL for 1906 (completed as far as possible).

Stations.	1906.		Average for previous Years.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of years.
East Kimberley:				
Wyndham ...	2833	53	2821	20
6-Mile	3424	42	3056	5
Carlton	3420	54	3231	8
The Stud Station	3720	50	3583	5
Argyle Downs ...	3265	—	2587	14
Rosewood Downs	...	...	2610	17
Lisadell	...	...	2640	8
Turkey Creek ...	3097	63	2825	8
Ord River ...	...	...	2001	9
Alice Downs ...	*2209	42	...	...
Flora Valley ...	...	...	1938	7
Hall's Creek ...	1652	46	2177	15
Nicholson Plains	*1206	14	...	...
Ruby Plains ...	*824	34	2260	5
Denison Downs	...	...	2061	5
West Kimberley:				
Mt. Barnett ...	...	...	...	...
Corvendine ...	...	...	...	...
Leopold Downs	*1185	27	2230	6
Fitzroy Crossing (P.O.)	2239	46	2319	12
Fitzroy Station	...	...	...	...
Quanbun ...	820	22	2111	7
Nookanbah ...	...	...	2010	6
Upper Liveringa	2301	43	2179	6
Yeeda	...	...	2275	15
Derby	3243	46	2699	20
Pt. Torment ...	4245	46	...	...
Obagama ...	2483	48	3335	10
Beagle Bay ...	3119	58	...	...
Roebuck Downs	1870	19	...	...
Kimberley Downs	..	...	...	...
Broome	2171	34	2345	16
Thangoo ...	...	...	2209	12
La Grange Bay	2516	41	1929	15
N.W. Coast:				
Wallal	979	31	1581	9
Pardoo	779	26	...	...
Condon	692	19	1529	16
DeGrey River ...	*744	13	1169	17
Port Hedland ...	921	31	1557	8
Boodarie ...	699	19	1324	18
Balla Balla ...	...	...	1798	6
N.W. Coast—*contd.*				
Whim Creek ...	1078	27	2491	9
Mallina	*1094	14	1234	5
Croydon ...	1282	25	1468	6
Sherlock ...	...	...	...	...
Woodbrooke ...	1100	21	1547	9
Cooyapooya ...	870	16	1450	7
Roebourne ...	943	20	1292	20
Cossack	1020	19	1172	25
Fortescue ...	674	18	1025	18
Mardie ...	*768	15	699	18
Chinginarra ...	*675	14	828	16
Yarraloola ...	632	12	985	7
Peedamullah ...	913	18	115	11
Onslow	652	25	818	20
Point Cloates ...	...	...	1195	7
N.W. (Inland):				
Warrawagine ...	*1332	15	1534	8
Eel Creek ...	*1730	23	1506	8
Muccan ...	*1719	25	1460	7
Ettrick	*1030	12	..	...
Mulgie	*1054	13	1296	17
Warralong ...	1179	26	1505	7
Coongon ...	1305	26	1231	11
Talga	...	...	...	...
Bamboo Creek ...	*1447	32	1798	8
Moolyella ...	...	...	...	...
Marble Bar ...	1198	46	1448	11
Warrawoona ...	1070	25	1540	6
Corunna Downs	942	32	1342	8
Mt. Edgar ...	1437	27	988	5
Nullagine ...	1148	29	1454	9
Middle Creek ...	878	26	...	...
Mosquito Creek	...	...	...	...
Roy Hill ...	...	...	725	5
Bamboo Springs	*822	13	...	...
Kerdiadary ...	*1034	14	1108	5
Woodstock ...	1210	23	1859	5
Station Peak ...	1339	22	1660	7
Mulga Downs ...	*755	21	1207	8
Mt. Florence ...	940	25	1514	20
Tambrey ...	1696	36	1710	10
Millstream ...	1292	23	1505	10
Red Hill ...	953	11	1436	7
Mt. Stewart ...	...	...	1594	6

* Signifies 11 months only. ... Signifies "Incomplete returns."

RAINFALL—*continued.*

STATIONS.	1906.		AVERAGE FOR PREVIOUS YEARS.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of years.
N.W. (INLAND)—*continued.*				
Peake Station ...	1378	24	...	...
Nanutarra ...	*995	15	1088	7
Yanrey	1286	27	1046	9
Wogoola ...	1103	...	1183	7
Towera	1495	41	1007	13
GASCOYNE:				
Winning Pool ...	975	30	1171	8
Coordalia ...	*858	...	...	...
Wandagee ...	1061	23	900	15
Williambury ..	1291	33	836	17
Yanyeareddy ...	*1209	22	1226	7
Maroonah ...	1344	...	848	10
Ullawarra ...	...	...	833	9
Mt. Mortimer ...	...	...	878	9
Edmunds ...	*839	32		...
Minnie Creek ...	1036	26	844	6
Gifford Creek ...	*829	19	...	...
Bangemall ...	*815	16	874	6
Mt. Augustus ...	...	...	...	...
Upper Clifton Downs	*839	20	...	...
Clifton Downs ...	*769	12	857	7
Dairy Creek ...	...	...	720	5
Mearerbundie ...	...	...	...	...
Byro	*867	25	848	7
Meedo	594	24	909	6
Mungarra ...	896	29	795	5
Bintholya ...	...	...	...	...
Booloogooroo ...	...	...	..	...
Doorawarrah ...	*843	29	776	8
Brick House ...	...	...	...	...
Boolathana ...	...	...	995	9
Carnarvon ...	752	40	886	23
Dirk Hartog ...	1256	57	1194	12
Sharks Bay ...	756	29	754	12
Wooramel ...	565	33	930	7
Hamelin Pool ...	580	44	764	20
Kararang ...	895	45	967	12
Tamala	...	...	1207	5
YALGOO DISTRICT:				
Woolgorong ...	660	29	...	...
New Forest ...	...	...	893	5
Yuin	658	26	817	5
Pindathuna ...	689	22	...	...
Tallyrang ...	...	...	...	...
YALGOO DISTRICT—*continued.*				
Mullewa ...	1102	53	1124	10
Kockatea ...	1169	46	...	...
Barnong ...	768	20	...	...
Gullewa... ...	322	...	899	7
Gullewa House	852	35	...	...
Gabyon	972	39	939	15
Mellenbye ..	892	42	...	...
Wearagaminda	858	42	...	...
Yalgoo	1929	39	835	9
Wagga Wagga	695	31	...	...
Muralgarra ...	*689	27	...	...
Burnerbinmah...	791	37	...	...
Nalbara... ...	630	48	...	...
Wydgee... ...	899	31	...	...
Field's Find ...	715	34	910	7
Rothesay ...	...	...	1099	6
Ninghan ...	1015	38	...	...
Condingnow ...	975	41	...	...
163-Mile ...	1028	31	...	...
Palaga Rocks ...	...	...	...	...
126-Mile ...	1032	44	...	...
90-Mile	1227	30	...	...
Mt. Jackson ...	1022	43	889	7
MURCHISON:				
Wale	*615	28	...	...
Yallalonga ...	...	...	...	...
Billabalong ...	*573	21	657	5
Twin Peaks ...	657	27	...	...
Murgoo	782	27	713	17
Mt. Wittenoom	635	22	639	5
Meka	814	27	728	5
Woleane ...	663	24	750	11
Boolardy ...	*700	21	691	15
Woogorong ...	*723	24	738	6
Manfred ...	*702	24	767	7
Yarra Yarra ...	*774	25	741	7
Milly Milly ...	784	20	710	7
Berringarra ...	772	21	801	18
Mileura ...	713	30	900	7
Mt. Gould ...	588	19	728	12
Moorarie ...	634	21	637	13
Peak Hill ...	955	28	1089	8
Abbotts	588	19	959	7
Belele	...	...	798	6
Meekatharra ...	...	...	...	...
Star of the East	637	22	943	6

* Signifies 11 months only. ... Signifies "Incomplete returns."

RAINFALL—*continued.*

Stations.	1906.		Average for previous Years.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of years.
Murchison—*contd.*				
Minderoo ...	508	15	..	...
Nannine ...	713	23	772	11
Annean	679	24	773	14
Tuckanarra ...	555	9	...	...
Coodardy ...	*738	19	891	5
Cue	1050	39	787	11
Day Dawn ...	802	25	721	10
Lake Austin ...	1076	28	775	8
Lennonville ...	881	47	835	5
Mt. Magnet ...	722	34	711	11
Youeragabbie ..	724	21	689	7
Murrum ...	570	15	616	5
Challa	904	35	682	10
Nunngara ...	833	20	...	.
East Murchison:				
Gum Creek ...	710	14	...	...
Dural	*586	24	...	...
Wiluna	780	39	1125	8
Mt. Sir Samuel	1119	30	857	5
Lawlers	727	36	890	9
Lake Darlôt ...	748	..	1083	5
Darda	713	25	...	..
Salt Soak ...	668	38	...	...
Duketon ...	600	19	...	...
North Coolgardie Goldfields:				
Burtville ...	...	...	...	...
Laverton ...	915	36	1108	6
Mt. Morgans ...	656	24	877	8
Murrin Murrin	774	33	865	7
Mt. Malcolm ...	735	27	800	8
Mt. Leonora ...	731	30	816	8
Tampa	767	19	752	5
Kookynie ...	727	32	...	...
Niagara ...	833	35	795	9
Yerilla	1024	...	852	8
Yundamindera	1078	35	850	5
Mt. Celia ...	...	...	..	...
Edjudina ...	712	31	1166	5
Quandinnie ...	841	22	...	...
Menzies	874	31	853	9
Mulline	1208	50	...	...
Mulwarrie ...	1118	50	...	...
Goongarrie ...	1289	34	865	10
Coolgardie Goldfields:				
Waverley ...	...	...	...	...
Bardoc	850	30	...	...
Broad Arrow ...	1078	38	979	8
Kanowna ...	991	42	877	10
Kurnalpi ...	996	40	903	9
Bulong	953	44	895	9
Kalgoorlie ...	905	40	951	10
Coolgardie ...	969	51	882	13
Burbanks ...	955	41	1043	6
Bulla Bulling	909	42	910	9
Woolubar ...	985	...	1035	5
Waterdale ...	1197	41	...	...
Widgemooltha...	1098	65	1041	8
50-Mile	1211	49	1003	8
Norseman ...	1091	65	1025	10
Lake View ...	1036	70	...	...
Frazer Range ...	931	47	1144	5
Southern Hills ...	954	...	...	...
Yilgarn Goldfields:				
129-Mile ...	1298	62	...	...
Emu Rocks ...	*980	62	...	...
56-Mile . .	1258	...	..	...
Glenelg Rocks ...	1006	74	...	...
Burracoppin ...	913	35	1064	6
Bodallin ...	806	22	1091	6
Parker's Road ...	*879	26	...	...
Southern Cross...	962	65	892	16
Parker's Range	1175	79	1180	5
Yellowdine ..	1067	41	943	7
Karalee	1152	28	1115	8
Koorarawalyee...	1400	48	. .	...
Boorabbin ...	1308	45	965	11
Boondi	1356	55	...	...
South-West—Northern Division:				
Murchison House	*1423	58	1514	6
Mt. View ...	1003	29	1212	6
Mumby	1731	60	...	...
Northampton ...	2061	56	2075	24
Chapman Exp. Farm	1500	38	...	...
Narra Tarra ...	1727	40	1826	6
Oakabella ...	1794	—	1758	9

* Signifies 11 months only. ... Signifies "Incomplete returns."

RAINFALL—*continued.*

Stations.	1906.		Average for Previous Years.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of years.
South-West—Northern Division—*continued.*				
White Peak ...	1900	48	...	...
Geraldton ...	2039	67	1730	29
Hinton Farm ...	1758	47	1750	5
Tibradden ...	1953	66	2090	5
Myaree	1738	69	...	...
Sand Springs ...	...	...	1706	5
Nangetty ...	...	...	...	..
Greenough ...	1702	57	1949	24
Bokara	1888	65	...	...
Dongara ...	1988	63	1927	23
Strawberry ...	1807	63	...	...
Yaragadee ...	...	...	...	...
Urella	...	...	...	...
Opawa	1322	61	..	...
Mingenew ...	1535	55	1599	10
Yandenooka ...	1637	54	...	...
Carnamah ...	1669	71	1453	18
Watheroo ...	1678	74	1589	6
Nergaminon ...	...	...	...	...
Dandaragan ...	2440	78	2311	8
Yatheroo ...	*2353	74	2446	21
Moora	2042	70	1674	8
Walebing ...	2060	92	1824	22
Round Hill ...	1743	76	..	...
New Norcia ...	2002	106	2012	23
Wongon Hills ...	1387	82	...	...
Wannamel ...	2791	90	...	...
Gingin	3081	84	3017	17
South-West (Metropolitan):				
Wanneroo ...	2761	86	...	...
Belvoir	2851	96	2968	17
Wandu	3085	132	...	...
Mundaring ...	4055	100	1459	12
Canning Waterworks	3801	95	3915	16
Kalbyamba ...	3169	96	...	...
Guildford ...	3012	102	3336	26
Perth Gardens ...	3151	112	3308	30
Perth Observatory .	3237	121	8293	9
Highgate Hill ...	3108	108	...	...
Subiaco	3111	110	3190	8
Claremont ...	2912	84	2820	12
Fremantle ...	2483	113	2928	28
South-West (Metropolitan)—*cont.*				
Rottnest ...	2097	111	2851	24
Rockingham ...	2804	90	3194	8
Jandakot ...	3345	91	...	...
Armadale ...	...	...	3308	5
Mundijong ...	3213	114	...	...
Jarrahdale ...	4519	118	4192	23
Jarrahdale (Norie)	4215	119	...	...
Serpentine ...	3478	108	...	...
Extreme South-West:				
Mandurah ...	4091	114	3498	16
Pinjarrah (Blythewood)	3708	115	...	...
Pinjarra ...	3794	101	3796	27
Upper Murray ...	4850	134	...	...
Yarloop	3950	124	...	...
Harvey	4193	129	3833	9
Brunswick ...	3791	95	...	...
Collie	3749	119	3422	5
Glen Mervyn ...	3434	107	3575	5
Donnybrook ...	3942	114	3341	5
Boyanup ...	3931	123	3667	8
Bunbury ...	3138	119	3676	29
Busselton ...	3331	136	2934	25
Quindalup ...	3760	134	3769	10
Cape Naturaliste	3122	150	...	...
Glen Lossie ...	...	...	...	...
Karridale ...	3939	161	4385	12
Cape Leeuwin ...	3424	207	3531	9
Lower Blackwood	3759	126	4210	6
Ferndale ...	4018	—	...	...
Greenbushes ...	3676	103	3683	13
The Peninsula ...	3341	140	...	...
Bridgetown ...	3400	138	3280	18
Hilton	2762	65	...	...
Greenfields ...	2963	93	...	...
Cundinup ...	*1997	77	...	...
Wilgarrup ...	3520	148	3360	5
Balbarrup ...	3850	101	3450	8
Bidellia	..	...	4331	5
The Warren ...	...	...	5102	7
Westbourne ...	2930	113	...	...
Deeside	2510	119	3018	5
Riverside ...	3469	131	3164	6
Mordalup ...	2887	110	2534	5
Lake Muir ...	3382	120	3086	7

* Signifies 11 months only. ... Signifies "Incomplete returns."

RAINFALL—*continued.*

Stations.	1906.		Average for Previous Years.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of years.
Eastern Agricultural Districts:				
Emungin ...	*1419	98	...	...
Dowerin ...	1319	59	...	...
Hatherley ...	1140	45	1476	10
Momberkine ...	*1552	63	1547	5
Eumalga ...	2302	82	2312	7
Newcastle ...	1941	75	2076	26
Craiglands ...	3125	91	...	...
Eadine	...	...	...	...
Northam ...	1555	83	1609	25
Grass Valley ...	...	...	1553	16
Cobham... ...	1727	82	1813	13
York	1453	92	1736	29
Yenelin... ...	1616	81	...	...
Meckering ...	1288	63	1482	6
Cunderdin ...	*1235	54	...	...
Doongin ...	1059	51	1227	11
Whitehaven ...	1611	46	1675	6
Mt. Caroline ...	1204	49	...	...
Cutenning ...	995	56	1279	10
Kellerberrin ...	1064	63	1271	13
Cardonia ...	1012	61	...	...
Baandee ...	1023	38	...	...
Nangeenan ...	1014	43	...	...
Merredin ...	1011	50	...	...
Codg-Codgen ...	1226	74	...	...
Noongarin ...	1131	50	...	...
Mangowine ...	1130	60	1118	19
Yarragin ...	1235	60	...	...
Wattoning ...	...	...	971	9
Great Southern Railway Line:				
Dalebridge ...	1618	80	...	...
Beverley ...	1722	70	1491	23
Brookton ...	1683	63	...	...
Sunning Hill ...	1760	102	1809	17
Pingelly ...	1636	63	1671	15
Yornaning ...	1719	92	...	...
Narrogin ...	1865	89	1863	14
Narrogin Experimental Farm	2311	...	..	...
Wagin	1739	73	1710	15
Katanning ...	1936	92	1715	14
Sunnyside ...	1936	114	1896	8
Broomehill ...	1899	88	1833	15
Great Southern Railway Line—*continued.*				
Woodyarrup ...	1849	78	1902	6
Pallinup ...	1637	—	1545	15
Tambellup ...	1918	90	...	...
Toolbrunup ...	1771	70	...	...
Cranbrook ...	2170	134	1798	15
Stirling View ...	2300	—	...	...
Kendenup ...	2508	128	2602	5
Woogenellup ...	1947	118	...	...
Wattle Hill ...	*2463	166	3356	7
St. Werburgh's	2501	156	2583	13
Mt. Barker ...	2633	163	2677	19
West of Great Southern Railway Line:				
Talbot House ...	1626	67	...	...
Jelcobine ...	1820	70	...	...
Bannister ..	2558	81	2531	21
Wandering ...	2408	85	2375	17
Glen Ern ...	1857	88	...	...
Marradong ...	2703	74	2876	8
Wonnaminta ...	1975	104	..	...
Williams ...	1816	70	2160	21
Rifle Downs ...	2702	65	..	...
Darkan	1850	—	2159	7
Arthur River ...	1900	80	1853	15
Glenorchy ..	2221	66	...	...
Kojonup ...	2196	73	2175	21
Blackwattle ...	2563	...	...	...
Warriup ...	2527	—	...	...
Forest Hill ...	3242	154	3383	6
East of Great Southern Railway Line:				
Sunset Hills ...	..	...	1687	6
Oakdale... ...	1685	...	.	...
Barrington ...	1500	73	1657	9
Bally Bally ...	1553	91	...	...
Stock Hill ...	1551	54	...	...
Qualin	1358	57	...	...
Woodgreen ...	882	76	...	...
Gillimanning ..	1451	76	...	...
Wickepin ...	1959	80	1841	8
Crooked Pool ...	1653	74	...	...
Bunking ...	1347	47	...	...

* Signifies 11 months only. ... Signifies "Incomplete returns."

RAINFALL—*continued.*

STATIONS.	1906.		AVERAGE FOR PREVIOUS YEARS.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of years.
EAST OF GREAT SOUTHERN RAILWAY LINE—*cont.*				
Bullock Hills ...	1667	61	...	...
Dyliabing ...	1636	93	1660	7
Glencove ...	1663	86	1906	8
Cherillalup ...	1642	73	...	...
Mianelup ...	1714	102	...	...
Woolganup ...	1717	78	...	...
Chillinup ...	1528	32	...	...
Jarramongup ...	...	...	1565	11
SOUTH COAST:				
Wilson's Inlet ...	3762	168	...	...
Grasmere ...	3849	176	...	...
King River ...	3156	116	..	...
Albany	3880	187	3493	29
Point King ...	3463	127	3547	10
Breaksea ...	3416	206	2745	16
Cape Riche ...	2106	58	2259	9
Peppermint G've	2812	129	...	...
Bremer Bay ...	2277	111	2286	21

STATIONS.	1906.		AVERAGE FOR PREVIOUS YEARS.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of years.
SOUTH COAST—*cont.*				
Coconarup ...	1295	92	1483	7
Ravensthorpe ...	1478	105	...	...
Hopetoun ...	1990	75	...	...
Cowjanup ...	1455	—	...	...
Fanny's Cove ...	*1737	66	2441	6
Park Farm ...	1823	97	2378	6
Grass Patch ...	970	44	1529	8
Swan Lagoon ...	1339	72	1599	8
30-Mile	1450	82	1856	6
Gibson's Soak ...	1795	97	2095	8
Myrup	1971	110	...	...
Esperance ...	2349	110	2509	22
Boyatup ...	2126	86	...	...
Lynburn ...	1905	107	2222	5
Middle Island ...	...	...	...	...
Pt. Malcolm ...	1497	99	...	...
Israelite Bay ...	1085	89	1475	21
Balbinia ...	*1188	72	...	...
Balladonia ..	857	64	973	15
Eyre	1009	79	1095	21
Mundrabella ...	.	...	...	...
Eucla	1121	69	1041	22

* Signifies 11 months only. ... Signifies "Incomplete returns."

The Observatory, Perth,
29th January, 1907.

W. E. COOKE,
Government Astronomer.

NOTES ON THE CLIMATE FOR THE MONTH OF JANUARY, 1907.

This month was, on the whole, hotter than usual in West coastal districts, but unusually cool on the Goldfields. It is, in fact, probable that the temperature was below normal throughout the greater part of Australia, because both Adelaide and Melbourne report readings considerably below the means for previous years. Notwithstanding the severity of the present summer on and near the West coast, there have been no prolonged heat waves. The weather has been dominated by a series of "highs" passing from West to East along the South coast, combined with a succession of small "lows," which have come down from the Tropics. These have either passed across from the North-West coast to the Bight, giving great heat in the interior, or have kept out in the Indian Ocean and travelled down the coast and round the Leeuwin and thence Eastward. In the latter case, they have been preceded by considerable heat in Western districts, and followed by a gradual cooling, and a day or two of fresh, rather pleasant weather. Geraldton seems to have experienced the greatest abnormal effect from the heating process, as the mean maximum for the month was 7.9 deg. above the average for previous years. In fact, this January has been by far the hottest on record for Geraldton.

The effect of the sea in modifying temperature can, as usual, be well seen from the returns of the mean daily maximum. Thus, for Rottnest it is 78.9 deg., Fremantle 83.3 deg., Perth Observatory 85.0 deg., Perth Gardens 87.3 deg., Guildford 89.1 deg., and Northam 91.4 deg. Proceeding further East, we come under the influence of the abnormal coolness which characterised the greater part of Australia, and at Coolgardie the mean maximum is 87.6 deg., or practically the same as for the Perth Gardens. The nights were considerably cooler on the Fields than near the coast. Thus the mean maximum at Coolgardie was 59.1 deg., whereas at the Observatory it was 64.8 deg., and at Fremantle 65.3 deg.

On the South coast cool weather prevailed, as usual. At Cape Leeuwin the mean maximum was only 75.0 deg., at Albany 73.8 deg., and at Breaksea 69.0 deg. ; whilst the highest reading for the month was only 83.0 deg. at Cape Leeuwin, and 77.0 deg. at Breaksea.

Pressure was about normal throughout the South-Western district, above the average for previous years on the Goldfields, and below in the Tropics.

The rainfall was heavier than usual in the Kimberley district and at Wallal it was the heaviest on record (13.64 inches). South of the Tropics it was, as usual, light, and on the whole about normal.

W. E. COOKE,
Government Astronomer.

The Observatory, 6th February, 1907.

The Climate of Western Australia during January, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						January, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
North-West and North Coast:	Wyndham	29·700	29·770	29·856	29·549	95·2	81·5	88·4	103·8	73·8	96·6	79·4	111·8	69·0	454	11	454
	Derby	29·734	29·792	29·928	29·540	93·3	77·3	85·3	103·8	72·8	96·4	78·3	107·5	70·0	890	16	890
	Broome	29·746	29·780	29·883	29·510	90·4	77·6	84·0	96·0	71·8	92·8	79·1	105·5	68·0	1230	14	1230
	Condon	29·706	29·780	29·885	29·433	95·0	77·6	86·3	104·8	71·0	94·6	76·3	106·5	65·0	150	5	150
	Cossack	29·710	29·768	29·910	29·480	98·0	78·0	88·0	110·0	71·0	99·4	78·0	113·4	68·8	297	5	297
	Onslow	29·742	29·780	29·952	29·510	98·6	76·8	87·7	116·2	70·2	97·7	73·7	117·0	63·0	*Nil*	...	*Nil*
	Winning Pool ...	29·730	...	29·919	29·482	105·0	75·1	90·0	112·0	67·0	...	...	...	...	275	4	275
	Carnarvon	29·784	29·842	29·950	29·510	92·0	72·9	82·4	108·8	65·4	88·9	70·4	113·7	58·2	8	1	8
	Hamelin Pool... ...	29·806	29·834	30·097	29·513	99·0	74·7	86·8	110·2	59·4	98·6	68·3	112·0	51·4	20	1	20
	Geraldton	29·863	29·912	30·138	29·630	91·4	64·9	78·2	109·5	53·4	83·5	63·8	111·2	49·8	*Nil*	...	*Nil*
Inland:	Hall's Creek	29·730	29·811	29·934	29·594	95·7	75·1	85·4	106·0	65·8	98·4	74·5	110·0	50·0	895	10	895
	Marble Bar	...	...	...	...	105·0	78·5	91·8	115·4	71·4	106·6	78·8	120·5	66·2	239	8	239
	Nullagine	29·682	29·754	29·938	29·540	103·6	75·7	89·6	112·0	67·0	102·9	74·6	117·0	62·9	83	7	83
	Peak Hill	29·745	29·768	30·060	29·480	101·0	75·0	88·0	110·0	66·0	99·3	74·1	111·2	52·6	*Nil*	...	*Nil*
	Wiluna	29·782	29·770	30·082	29·577	95·5	70·9	83·2	107·0	61·0	97·9	71·1	111·2	54·8	*Nil*	...	*Nil*
	Cue	29·793	29·812	30·119	29·579	99·9	70·8	85·4	110·5	60·0	101·4	72·8	114·0	52·8	46	2	46
	Murgoo	...	...	...	...	99·3	72·1	85·7	109·0	58·5	...	...	...	...	104	2	104
	Yalgoo	29·826	29·828	30·136	29·558	94·2	69·6	81·9	109·0	56·2	99·4	68·7	114·0	53·6	59	2	59
	Nungarra	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Lawlers	29·837	29·832	30·190	29·585	93·6	68·6	81·1	105·4	55·4	96·7	71·5	112·7	52·3	40	...	40
	Laverton	29·864	29·854	30·263	29·495	91·4	65·3	78·4	106·0	53·0	96·0	69·1	113·1	53·0	*Nil*	...	*Nil*
	Menzies	29·902	29·863	30·274	29·618	90·6	63·1	76·8	105·0	59·0	94·7	67·6	113·2	48·0	47	1	47
	Kanowna	...	...	...	...	...	...	...	...	...	...	...	...	...	14	3	14
	Kalgoorlie*	29·918	29·902	30·333	29·510	89·2	60·5	74·8	106·0	50·0	93·0	63·9	114·4	47·1	18	2	18
	Coolgardie	29·930	29·900	30·355	29·547	87·6	59·1	73·4	104·2	47·9	92·8	62·2	113·3	46·0	23	5	23
	Southern Cross ...	29·945	29·882	30·310	29·540	91·0	61·0	76·0	107·0	48·0	94·8	62·2	114·7	44·0	37	5	37
	Kellerberrin	...	...	...	...	...	...	...	...	...	...	...	...	...	30	4	30
	Walebing	...	...	...	...	91·2	63·4	77·3	103·0	53·8	91·2	60·5	109·7	46·8	73	5	73
	Northam	...	...	...	...	91·4	62·1	76·8	108·2	52·5	92·8	60·8	111·1	45·4	50	4	50
	York	29·912	29·932	30·256	29·598	90·5	60·6	75·6	105·5	51·0	91·6	60·6	111·0	45·5	43	3	43
	Guildford	...	...	...	...	89·1	63·8	76·4	106·0	55·0	88·5	59·9	109·7	46·8	60	4	60

* Averages for three years only.

The Climate of Western Australia during January, 1907—*continued.*

Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
					January, 1907.					Average for previous Years.						
	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
South-West and South Coast:																
Perth Gardens	29·931	29·938	30·284	29·638	87·3	65·0	76·2	104·0	56·0	86·9	62·6	116·7	46·0	47	5	47
Perth Observatory ...	29·944	29·950	30·295	29·644	85·0	64·8	74·9	103·6	55·2	84·0	62·7	107·0	50·6	42	6	42
Fremantle	29·960	29·963	30·305	29·697	83·3	65·3	74·3	100·5	55·0	80·0	63·6	105·0	51·8	57	6	57
Rottnest	29·947	29·948	30·297	29·676	78·9	64·7	71·8	97·0	55·6	77·0	63·9	102·2	52·5	65	5	65
Mandurah	...	...	...	...	85·6	62·0	73·8	103·2	49·0	84·0	59·7	107·0	41·4	29	4	29
Marradong	...	...	...	...	...	...	...	...	...	...	...	...	...	25	4	25
Wandering *	...	...	...	...	86·9	55·2	71·0	103·0	43·1	87·9	53·7	104·9	40·1	41	5	41
Narrogin	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Collie	...	...	...	...	86·5	54·7	70·6	100·0	40·2	85·0	53·3	103·0	37·7	16	4	16
Donnybrook	...	...	...	...	85·6	57·8	71·7	99·4	41·0	83·4	53·5	101·5	38·9	20	2	20
Bunbury	29·978	29·982	30·356	29·673	84·1	59·3	71·7	96·2	47·2	81·6	57·9	103·1	43·4	23	3	23
Busselton	...	...	...	...	83·3	57·5	70·4	96·0	42·5	81·3	54·8	99·2	40·4	17	2	17
Cape Naturaliste ...	29·990	.	30·370	29·670	76·2	59·0	67·6	89·0	48·5	...	...	...	...	58	4	58
Bridgetown	...	...	...	...	85·6	52·6	69·1	97·0	35·2	84·1	50·7	102·5	34·1	22	4	22
Karridale	30·020	30·014	30·360	29·640	78·0	57·0	67·5	91·0	43·0	75·3	56·9	99·6	42·1	14	4	14
Cape Leeuwin	29·995	29·986	30·370	29·690	75·0	62·0	68·5	83·0	55·0	73·0	61·8	91·6	51·0	20	7	20
Katanning	29·992	29·960	30·402	29·697	84·4	53·8	69·1	105·0	42·0	86·7	54·6	108·7	42·0	50	4	50
Mt. Barker	...	...	...	...	76·2	53·2	64·7	94·2	40·8	...	...	...	...	98	6	98
Albany	30·046	30·010	30·436	29·668	73·8	58·0	65·9	87·2	49·2	72·8	56·8	101·2	42·3	106	6	106
Breaksea...	30·045	30·006	30·450	29·630	69·0	60·0	64·5	77·0	46·0	69·4	59·0	91·6	46·8	94	12	94
Esperance	30·021	29·990	30·381	29·690	76·7	58·5	67·6	93·5	40·0	77·5	59·0	117·0	40·8	90	8	90
Balladonia	30·009	29·952	30·404	29·620	81·1	54·1	67·6	103·0	44·0	87·6	57·4	111·2	42·6	56	6	56
Eyre	29·971	29·986	30·333	29·506	74·5	58·2	66·4	102·4	41·3	78·4	59·2	112·0	41·5	18	4	18
INTERSTATE.																
Perth	29·944	29·950	30·295	29·644	85·0	64·8	74·9	103·6	55·2	84·0	62·7	107·0	50·6	42	6	42
Adelaide	29·930	29·937	30·310	29·480	82·5	59·0	70·8	106·2	50·0	86·6	61·7	116·3	45·1	9	2	9
Melbourne	29·900	29·831	30·288	29·437	76·0	57·0	66·5	95·6	49·9	78·1	56·4	111·2	42·0	110	8	110
Sydney	...	29·929	...	...	...	...	...	...	...	78·2	64·8	108·5	51·2	...	...	...

* Averages for three years only.

The Observatory, Perth, 6th February, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for December, 1906 (completed as far as possible), and for January, 1907 (principally from Telegraphic Reports).

Stations.	December, 1906.		January, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points 100 = 1in.	No. of wet days.
East Kimberley:				
Wyndham ...	1001	16	454	11
6-Mile	1458	17	...	...
Carlton	1218	16	...	...
Ivanhoe	1413	15	...	...
Argyle Downs ...	1284	17	...	...
Rosewood Downs	...	...	...	...
Lisadell	..	...	...	...
Turkey Creek ...	1247	16	1090	13
Ord River ...	...	...	...	...
Alice Downs ...	...	...	...	...
Flora Valley ...	...	...	...	...
Hall's Creek ...	963	16	895	10
Nicholson Plains	.	...	...	...
Ruby Plains ...	...	...	...	..
Denison Downs	...	...	...	...
West Kimberley:				
Mt. Barnett ...	...	...	...	...
Corvendine ...	...	...	...	...
Leopold Downs...	...	...	...	...
Fitzroy Crossing (P.O.)	635	12	898	12
Fitzroy Station ..	...	...	...	...
Brooking ...	...	...	...	...
Cherrabun ...	...	. .	...	...
Bohemia Downs	...	...	...	...
Quanbun ...	...	...	...	...
Nookanbah ...	...	...	...	..
Upper Liveringa	936	12	...	...
Yeeda	...	...	...	...
Derby	2082	19	890	16
Pt. Torment ...	2889	17	...	...
Obagama ...	1428	14	...	...
Beagle Bay ...	1037	16	..	...
Roebuck Downs	...	...	...	...
Kimberley Downs	...	..	..	...
Broome	1155	13	1230	14
Thangoo ...	...	...	...	...
La Grange Bay...	1260	9	728	12
N.W. Coast:				
Wallal	186	7	1364	9
Pardoo	60	5	...	...
Condon	14	3	150	3
DeGrey River ...	10	1	...	...
Port Hedland ...	33	2	174	9
Boodarie ...	68	3	...	...
N.W. Coast—*contd.*				
Balla Balla ...	...	...	...	...
Whim Creek ...	19	3	233	8
Mallina	...	...	...	...
Croydon	66	2	...	...
Sherlock... ...	...	...	...	...
Woodbrooke ...	100	4	...	...
Cooyapooya ...	137	1	...	...
Roebourne ...	Nil	...	425	6
Cossack	7	1	297	5
Fortescue ...	30	2	331	3
Mardie	116	1	...	...
Chinginarra ...	Nil	...	...	...
Yarraloola ..	Nil	...	...	...
Peedamullah ...	95	1	...	...
Onslow	2	1	Nil	...
Point Cloates ...	Nil	...	...	...
N.W. Inland:				
Warrawagine ...	...	...	...	...
Eel Creek ...	...	...	...	...
Muccan	...	...	...	...
Ettrick	..	...	...	...
Strelly	65	4	...	...
Mulgie	...	...	...	...
Warralong ...	216	7	..	...
Coongon ...	134	4	...	...
Talga	...	...	...	...
Bamboo Creek ...	102	5	810	10
Moolyella ...	...	...	..	...
Marble Bar ...	113	13	239	8
Warrawoona ...	94	6	110	5
Corunna Downs	158	5	...	...
Mt. Edgar ...	387	5	...	...
Nullagine ...	218	4	83	7
Middle Creek ...	252	6	...	...
Mosquito Creek	...	...	...	...
Roy Hill ...	...	...	...	...
Bamboo Springs	231	8	...	...
Kerdiadary ...	190	3	...	...
Woodstock ...	206	5	...	...
Yandyarra ...	...	...	...	...
Station Peak ...	200	3	...	...
Mulga Downs ...	102	3	...	...
Mt. Florence ...	182	5	...	...
Tambrey ...	138	5	...	...
Millstream ...	37	2	...	...

RAINFALL—*continued.*

Stations.	December, 1906.		January, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. Inland—*contd.*				
Red Hill ...	Nil	...	...	...
Mt. Stewart ...	...	...	...	...
Peake Station ...	24	5	...	...
Nanutarra ...	...	..	...	...
Yanrey	48	4	...	...
Wogoola ...	53	3	...	...
Towera	411	6	...	...
Gascoyne:				
Winning Pool ...	15	1	275	4
Coordalia ...	...	...	...	...
Wandagee ...	128	4	...	...
Williambury ...	2	2	...	...
Yanyeareddy ..	...	...	...	...
Maroonah ...	Nil	...	...	...
Ullawarra ...	...	...	...	...
Mt. Mortimer ...	...	...	...	...
Edmunds ...	...	...	...	...
Gifford Creek ...	Nil	...	...	...
Bangemall ...	...	...	...	...
Mt. Augustus ...	. .	...	...	...
Upper Clifton Downs	...	...	...	...
Clifton Downs ...	...	...	..	...
Mearerbundie ...	Nil	...		..
Byro	...	...	...	...
Meedo	29	4	...	...
Mungarra ...	97	3	...	...
Bintholya ..	...	...	...	..
Lyon's River ..	19	2	...	...
Mangaroon ...	Nil	...	...	...
Booloogooroo ...	...	...	...	...
Doorawarrah ...	...	...	...	...
Brick House ..	...	...	...	...
Boolathana ...	...	...	.	...
Carnarvon ...	Nil	...	8	1
Point Charles ...	Nil	...	...	...
Dirk Hartog ...	Nil	...	...	...
Sharks Bay ...	Nil	...	66	2
Wooramel ...	26	1	41	2
Hamelin Pool ...	7	2	20	1
Kararang ...	9	1	...	...
Tamala	...	...	...	...
Yalgoo District:				
Woolgorong ...	Nil	...	...	...
New Forest ...	Nil	...	...	...
Yuin	Nil	...	...	..

Stations.	December, 1906.		January, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Yalgoo District—*contd.*				
Pindathuna ...	10	1	..	...
Tallyrang ...	Nil	...	...	...
Mullewa ...	14	1	37	1
Kockatea ...	Nil	...	...	...
Barnong ...	Nil	...	100	1
Gullewa	Nil	...	...	...
Gullewa House...	Nil	...	105	1
Gabyon	4	2	...	...
Mellenbye ...	6	1	...	...
Wearagaminda...	10	3	75	2
Yalgoo	5	1	...	...
Wagga Wagga ...	31	2	25	1
Muralgarra ...	...	...	...	...
Burnerbinmah ...	35	3	Nil	...
Nalbara	45	5	...	...
Wydgee	88	2	Nil	...
Field's Find ...	31	3	17	1
Thundelarra ...	47	5	...	...
Rothesay ...	...	...	...	...
Ninghan ...	9	1	...	...
Condingnow ...	92	5	...	...
163-Mile ...	136	2	...	...
Palaga Rocks ...	...	...	...	...
126-Mile ...	43	4	...	...
90-Mile	33	2	...	...
Mt. Jackson ...	75	2	45	4
Murchison:				
Wale	...	..	...	...
Yallalonga ...	. .	...	...	...
Billabalong ...	Nil	...	...	...
Twin Peaks ...	Nil	...	...	...
Murgoo	10	2	104	2
Mt. Wittenoom ..	28	1	...	...
Meka	15	2	...	...
Wooleane ...	Nil	...	...	...
Boolardy ...	Nil	...	...	...
Yederah ...	...	...	...	...
Woogorong ...	37	1	...	...
Manfred ...	Nil	...	...	...
Yarra Yarra ..	...	..	...	...
Milly Milly ...	17	1	...	...
Berringarra ...	9	1	...	...
Mileura	42	3	...	...
Mt. Gould ...	50	1	...	...
Moorarie ...	35	3	...	...
Peak Hill ...	16	1	Nil	...
Minderoo ...	9	1	Nil	...
Abbotts	9	2	20	2
Belele	8	2	...	...

RAINFALL—*continued.*

Stations.	December, 1906.		January, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
MURCHISON—*contd.*				
Gabanintha	63	4	23	1
Bungalow	85	1	...	...
Quinn's	...	...	...	...
Nannine	28	2	Nil	...
Annean	23	3	Nil	...
Tuckanarra ...	90	2	...	...
Coodardy ...	50	1	...	...
Cue	131	3	46	2
Day Dawn ...	64	3	33	2
Lake Austin ...	84	2	41	2
Lennonville ...	111	4	55	3
Mt. Magnet ...	82	3	11	2
Youeragabbie ...	92	2	...	...
Murrum	Nil	...	Nil	...
Challa	108	3	9	1
Nunngara ...	...	...	...	..
Berrigrin ...	112	2	...	...
EAST MURCHISON:				
Gum Creek ...	40	2	...	...
Dural	...	...	...	...
Wiluna	45	2	Nil	...
Mt. Sir Samuel ...	73	3	Nil	...
Lawlers	9	2	40	1
Granite Station	12	2	...	...
Wilson's Patch...	34	1	...	...
Poison Creek ...	...	...	...	...
Lake Darlôt ...	82	3	...	...
Darda	41	1	...	...
Salt Soak ...	22	5	...	...
Duketon ...	Nil	...	...	..
NORTH COOLGARDIE GOLDFIELDS:				
Laverton ...	147	1	Nil	...
Mt. Morgans ...	Nil	...	3	1
Murrin Murrin...	34	1	9	2
Mt. Malcolm ...	Nil	...	30	3
Mt. Leonora ...	Nil	...	6	1
Tampa	Nil	...	...	...
Kookynie ...	Nil	...	...	...
Niagara	13	1	28	3
Yerilla	Nil	...	80	...
Yundamindera .	20	1	26	2
Mt. Celia ...	...	...	...	...
Edjudina ...	Nil	.	...	...
Quandinnie ...	Nil	...	...	...
Menzies	14	2	47	1
Mulline	44	4	43	3
Mulwarrie ...	41	2	81	3
Goongarrie ...	Nil	...	90	3

Stations.	December, 1906.		January, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH COOLGARDIE GOLDFIELDS—*contd.*				
COOLGARDIE GOLDFIELDS:				
Waverley ...	...	...	...	...
Bardoc	25	1	41	3
Broad Arrow ...	14	2	...	...
Kanowna ...	15	2	14	3
Kurnalpi ...	Nil	...	22	3
Bulong	56	2	25	4
Kalgoorlie ...	27	3	18	2
Coolgardie ...	25	3	23	5
Burbanks ...	58	3	4	1
Bulla Bulling ...	10	1	...	...
Woolubar ...	20	1	Nil	...
Waterdale ...	37	3	Nil	...
Widgiemooltha...	19	3	22	4
50-Mile	24	3	...	...
Norseman ...	25	4	38	3
Lake View ...	17	2	85	4
Frazer Range ...	Nil	...	..	...
Southern Hills ...	Nil	...	...	...
YILGARN GOLDFIELDS:				
129-Mile	75	6	...	...
Emu Rocks ...	...	...	...	...
56-Mile	88	3	...	...
Glenelg Rocks ...	122	3	...	...
Burracoppin ...	16	1	75	2
Bodallin ...	64	1	43	1
Parker's Road ...	...	...	...	...
Southern Cross ...	50	3	37	5
Parker's Range...	49	5	...	...
Yellowdine ...	50	1	82	3
Karalee	30	1	95	3
Koorarawalyee ..	81	3	24	4
Boorabbin ...	74	3	49	3
Boondi	80	2	13	2
SOUTH-WEST (NORTHERN DIVISION):				
Murchison House	...	...	...	...
Mt. View ...	Nil	...	...	...
Mumby	10	2	Nil	...
Northampton ...	9	1	Nil	...
Chapman Experimental Farm	Nil	...	...	...
Narratarra ...	Nil	...	...	...

RAINFALL—*continued.*

STATIONS.	DECEMBER, 1906.		JANUARY, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (NORTHERN DIVISION)—*contd.*				
Oakabella ...	Nil	...	...	...
White Peak ...	Nil	...	...	...
Geraldton ...	Nil	...	Nil	..
Hinton Farm ...	Nil	...	...	...
Tibradden ...	Nil	..	29	1
Myaree	Nil	...	...	...
Sand Springs ...	...	...	...	..
Nangetty ...	Nil	...	15	1
Greenough ...	Nil	...	3	1
Bokara	8	1	12	1
Dongara ...	5	1	Nil	...
Strawberry ...	9	1	69	1
Yaragadee ...	12	1	32	1
Urella	13	1	40	1
Opawa	15	2	...	...
Manara	6	1	...	...
Mingenew ...	2	1	26	2
Yandenooka ...	Nil	...	..	...
Arrino	Nil	...	Nil	...
Carnamah ...	9	3	147	3
Jun Jun	...	...	14	2
Watheroo ...	13	1	90	2
Nergaminon ...	...	..	75	1
Dandaragan ...	19	1	54	3
Yatheroo ...	Nil	...	46	1
Moora	18	2	50	1
Walebing ...	20	2	73	5
Round Hill ...	15	1	106	8
New Norcia ...	4	1	51	4
Wongon Hills ..	16	2	35	5
Wannamel ...	2	1	59	3
Gingin	Nil	...	41	3
SOUTH-WEST (METROPOLITAN):				
Wanneroo ...	Nil	...	...	...
Belvoir	Nil	..	...	...
Wandu	3	1	62	6
Mundaring ...	5	2	67	4
Canning Waterworks	9	2	...	...
Kalbyamba ...	9	2	...	...
Guildford ..	9	1	60	4
Perth Gardens ...	Nil	...	47	5
Perth Observatory	4	1	42	6
Highgate Hill ...	14	1	...	...
Subiaco	Nil	...	42	5
Claremont ...	Nil	...	...	...
SOUTH-WEST (METROPOLITAN)—*cont.*				
Fremantle ...	13	2	57	6
Rottnest	1	1	65	5
Rockingham ...	Nil	...	65	4
Jandakot ...	3	1	39	3
Armadale ...	23	4	...	...
Mundijong ...	4	1	71	4
Jarrahdale ...	Nil	...	65	5
Jarrahdale (Norie)	Nil	...	...	...
Serpentine ...	9	2	70	6
EXTREME SOUTH-WEST:				
Mandurah ...	6	2	29	4
Pinjarra (Blythewood)	Nil	...	...	...
Pinjarra ...	Nil	...	42	3
Upper Murray ...	14	4	...	..
Yarloop	15	4	47	5
Harvey	19	3	21	...
Brunswick ...	21	2	...	..
Collie	28	4	16	4
Glen Mervyn ...	31	3	...	...
Donnybrook ...	35	3	20	2
Boyanup ...	15	4	...	..
Bunbury ...	32	4	23	3
Elgin	5	2	27	3
Busselton ..	1	1	17	2
Quindalup ...	3	1	...	..
Cape Naturaliste	7	3	58	4
Glen Lossie ...	...	...	...	...
Karridale ...	95	6	14	4
Cape Leeuwin ...	118	10	20	7
Lower Blackwood	28	3	112	8
Ferndale ...	116	2	16	2
Greenbushes ...	37	4	16	3
Cooeearup ...	23	3	...	...
Bridgetown ...	39	4	22	4
Hilton	10	1	...	...
Greenfields ...	19	1	...	..
Dunninup ...	47	1	...	...
Cundinup ...	7	1	..	...
Wilgarrup ...	37	5	21	6
Balbarrup ...	91	2	...	...
Bidellia ...	...	...	...	..
Westbourne ...	72	1	...	...
Deeside	51	1	...	...
Riverside ...	41	1	...	...
Mordalup ...	88	2	...	...
Lake Muir ...	152	5	...	...

RAINFALL—*continued.*

Stations.	December, 1906.		January, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN AGRICULTURAL DISTRICTS:				
Walgo	11	1	40	2
Emungin	...	...	...	...
Dowerin	6	2	...	...
Warramuggin	..	...	...	...
Oak Hill	...	...	...	...
Baker's Hill	...	...	42	2
Monglin	...	...	...	...
Hatherley	Nil	...	...	...
Momberkine	...	...	...	...
Bolgart	Nil	...	...	...
Eumalga	Nil	...	...	...
Newcastle	Nil	...	12	1
Craiglands	4	1	46	3
Eadine	...	...	...	...
Northam	10	1	50	4
Grass Valley	...	...	..	...
Cobham	Nil	...	29	3
York	17	3	43	3
Burrayocking	7	2	...	...
Meckering	Nil	...	19	3
Cunderdin	...	...	...	...
Doongin	Nil	...	...	...
Whitehaven	Nil	...	...	...
Mt. Caroline	6	1	...	...
Cutenning	4	2	...	...
Kellerberrin	13	2	30	4
Cardonia	Nil	...	35	2
Baandee	10	1	163	3
Nangeenan	34	2	...	...
Merredin	31	3	61	2
Codg-Codgen	4	2	...	...
Noongarin	35	2	...	...
Mangowine	24	3	...	...
Yarragin	14	2	...	...
Wattoning	...	...	...	...
Koomberkyne	...	...	...	...
GREAT SOUTHERN RAILWAY LINE:				
Dalebridge	7	1	27	5
Beverley	Nil	...	83	4
Brookton	14	2	...	...
Sunning Hill	15	3	110	...
Pingelly	2	1	64	4
Yornaning	49	2	39	4
Narrogin	52	3	42	4
Rose Hill	70	2	...	...
Wagin	76	3	15	3
Katanning	93	2	50	4
Sunnyside	110	2	112	7
GREAT SOUTHERN RAILWAY LINE—*contd.*				
Broomehill	97	3	86	4
Woodyarrup	152	3	...	...
Pallinup	123	3	54	1
Tambellup	143	3	135	3
Toolbrunup	146	3	10	2
Cranbrook	90	4	...	...
Stirling View	93	3	66	5
Kendenup	91	3	...	...
Woogenellup	92	1	...	...
Wattle Hill	...	...	...	...
St. Werburgh's	118	8	94	6
Mt. Barker	98	8	98	6
WEST OF GREAT SOUTHERN RAILWAY LINE:				
Talbot House	Nil	...	..	...
Jelcobine	25	2	..	...
Bannister	30	2	...	...
Wandering	22	1	41	5
Glen Ern	53	2	...	...
Marradong	16	1	25	4
Wonnaminta	52	3	...	...
Williams	6	1	47	...
Rifle Downs	14	1	...	...
Darkan	30	1	..	...
Arthur River	46	4	42	4
Gainsborough	93	3	...	...
Glenorchy	21	2	...	...
Kojonup	20	1	40	1
Blackwattle	87	1	...	...
Warriup	98	5	122	6
Forest Hill	66	5	...	...
EAST OF GREAT SOUTHERN RAILWAY LINE:				
Sunset Hills	11	1	...	...
Oakdale	Nil	...	...	...
Barrington	3	1	...	...
Bally Bally	4	1	...	...
Stock Hill	4	2	...	...
Qualin	8	1	...	...
Woodgreen	15	3	...	...
Glenallan	5	1	82	3
Gillimanning	18	1	...	...

RAINFALL—*continued.*

Stations.	December, 1906.		January, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of Points. 100 = 1in.	No. of wet days.
East of Great Southern Railway Line—*contd.*				
Wickepin ...	36	2	...	...
Crooked Pool ...	70	2	39	3
Nallyring ...	56	2	...	...
Yardup ..	...	...	22	4
Bunking ...	30	1	34	4
Bullock Hills ...	75	2	...	...
Dyliabing ...	86	2	. .	...
Glencove ...	33	2	36	3
Cherillalup ...	66	2	...	...
Mianelup ...	60	4	...	...
Woolganup ...	81	2	...	...
Chillinup ...	115	4	...	...
Jarramongup ...	...	...	...	...
Uberin	10	2	...	...
South Coast:				
Wilson's Inlet ...	82	9	54	6
Grasmere ...	115	13	73	9
King River ...	125	4	61	3
Albany	159	12	106	6
Point King ...	136	7	...	...
Breaksea ...	225	14	...	...
Cape Riche ...	120	3	...	...

Stations.	December, 1906.		January, 1907.	
	No. of Points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
South Coast—*contd.*				
Peppermint Grove	152	7	...	...
Bremer Bay ...	142	8	48	8
Coconarup ...	62	5	49	7
Ravensthorpe ...	88	6	...	7
Cowjanup ...	79	4	51	...
Hopetoun ...	144	6	40	4
Fanny's Cove ...	...	...	...	...
Park Farm ...	37	4	...	...
Grass Patch ...	Nil	...	...	...
Swan Lagoon ...	13	1	...	...
30-Mile	17	3	...	...
Gibson's Soak ...	14	2	...	...
Myrup	8	1	...	...
Esperance ...	25	4	90	8
Boyatup... ...	21	2	...	...
Lynburn ...	10	2	...	...
Cape Arid ...	...	...	...	...
Point Malcolm ...	35	2	...	...
Israelite Bay ...	5	2	47	3
Balbinia... ...	...	...	...	...
Balladonia ...	56	2	56	6
Eyre	8	3	18	4
Mundrabella ...	...	...	...	...
Eucla	39	2	32	4

The Observatory, Perth,
6th February, 1907.

W. E. COOKE,
Government Astronomer.

By Authority : Fred. Wm. Simpson, Government Printer, Perth.

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EDITOR'S NOTES.

Wheat Crop.—The wheat crop for the whole of the Commonwealth is estimated to yield, in round numbers, 60,000,000 bushels, or about seven bushels per head of the population, one-half of which is required for home consumption.

Poultry Breeding.—Those who intend to go in for poultry keeping, or to increase their present stock, should remember that this is the best time of the year. Fertile eggs for hatching can be obtained from the egg-laying competition yards at Subiaco. The poultry notes by Mr. Robinson, Government Poultry expert, appearing in this issue should be read by all poultry people.

Exporting Seed Wheat.—A very fine consignment of wheat grown by Mr. Jos. Correll, of Arthur River, has been purchased by South Australian farmers for seeding, at 10s. 3d. per bushel. The yield for the past season of the wheat exported, comprised three varieties, and yielded 15, 18, and 22 bushels per acre.

Seed Wheat for Sale.—The Under Secretary for Agriculture desires it to be known that the Government has some seed wheat for sale specially cleaned and sound. The varieties include Alpha, Baroota Wonder, Sullivan's Early, Prolific, Toby's Luck, Australian Crossbreds 100-73-77, White Lammas, Plover, Golden Drop, Stemless Tardent's Blue, Gallant, Rerraf, and Yendillah King. The wheat will be sold in two-bag lots at prices ranging from 5s. to 6s. per bushel on trucks at Nangeenan, Narrogin, or Bowes' Siding. As it is essential that wheat should be sown early in the drier districts, immediate application should be made to the Under Secretary, Department of Agriculture.

Dingo Trapping.—Mr. W. Paterson, of the Agricultural Bank, who some time ago obtained and distributed a quantity of very seductive dingo bait, has received renewed applications for, as one writer puts it, "That stuff that draws the brutes whether they want to or not." Mr. Paterson desires it to be known that he has no more of the bait, but that it can be obtained from Messrs. Dalgety and Co., who are the agents.

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Lucerne and Ticks.—It is stated in Queensland that ticks will not adhere to cattle which are habitually fed on green lucerne. A well-known farmer, who has had experience of ticks, indicates that there is good ground for the belief that the lucerne-fed beast is not appreciated as a host by the pest. "Lucerne grazing," he said to a representative of the "Courier," "will not keep cattle entirely free from ticks, but it will help to do so; and if dipping is taken in conjunction, there should be very small losses, if any."

Stock and their Young.—Neither horses, cattle, nor sheep appear to place very much faith in sense of sight, but they make keen use of the faculties of smell and hearing. A mare separated for a short time from her own foal must have a sniff at it to begin with if the young thing is in a group of like age. A cow will act in the same way with her calf, and so will an ewe with her lamb. From the merely human point of view, a newly clipped ewe looks a little odd when searching for a lamb with a patch of black on its shoulder or with a dark "collar" on its neck. The ewe disregards all markings and outward pecularities ; she simply "noses" her way until she finds her own.

Cold Storage of Fruit.—Towards the end of last month the Under Secretary for Agriculture sent out circulars to all the Agricultural Societies, inviting fruitgrowers to send in cases of fruit for the purpose of demonstrating the advantages of the cool storage of fruit. It is pleasing to note that a hearty response was made to the invitation, and the value of storing will be fully realised. Periodically, cases of the fruit will be returned to the growers by the manager of the refrigerating works, and from these experiments the producers of each locality can judge for themselves the benefits that may be derived from cool storage.

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Good Cultivation.—Too much stress cannot be laid in the importance of good cultivation in connection with the growing of crops. Manuring is no substitute for bad cultivation; indeed, in order that manures may produce the best results it is essential that their application be accompanied by good cultivation. Aeration of the soil promotes plant growth, exposure of the soil to the atmosphere causes oxidation to take place, and thereby plant food is produced from the natural fertility of the soil. Good cultivation also ensures the extermination of weeds. It is false economy to manure a crop and allow the weeds to grow, since they withdraw from the crop part of the manure which has been applied, probably at considerable cost, without giving any return. Further, weeds not only use up the ingredients of plant food, but they deprive the crop of moisture.

The Hardy Mule.—The merits of the mule are dealt with by Mr. James Moffat in an article in the "Live Stock Journal," in which he states that "in Scotland, in the fifties and early sixties, where the mules were engaged doing the same work as the heaviest Clydesdales, the mule's power was beyond dispute. This they proved by drawing the same loads on the same roads in the same single horse carts of the country. Their endurance was proved by the period during which they retained a sound working life. The horses engaged in the same work were repeatedly worn out, and had to be replaced by others, and this several times over. This test of the mule's superior power and endurance was not carried out in a corner, nor yet confined to a brief trial, but extended over many years, hauling coals from the pit of Sir Alex. Ramsay, of Whitehall, Midlothian, to the paper mills in the Esk Valley."

Lime for the Ground.—The autumn is the best time of the year to apply lime to the ground, but if not convenient to apply at this time, a moderate application may be made at almost any time. In the absence of a lime distributor, the best method to apply lime is to make small piles on the surface at regular intervals, and cover these with earth; the moisture in the soil will soon cause the lime to slack, and as soon as it has come to a powdery condition it should be spread evenly over the soil and harrowed in. Lime in its caustic or quick state has the most power of producing the necessary chemical and physical changes in the soil, and therefore the object should be to get the lime into the soil in its native state, and well mixed with the soil before it has time to lose any of its active principles. Lime should not be allowed to "air slake" before being applied to the soil, as by doing so it absorbs the carbonic acid from the air and is changed back into carbonate, the form in which it existed before burning, and consequently the labour expended in burning the limestone has been lost.

Lamb Exportation.—An English journal devoted to the interests of cold storage, thus refers to the trial shipment of lambs from this State, made recently:—"Our anticipation last month that the trial shipment of Western Australian lambs, which arrived on the London market just about the time of our going to Press, would realise as much as 6½d. per lb., was correct. The Hon. C. H. Rason, the Agent General for the State from which this novel consignment came, says the fact that the lambs realised from 6¼d. to 6¾d. per lb. was partly due to the high quality of the meat and the excellent condition in which it was carried from the Antipodes in the P. & O. Company's R.M.S. *Britannia,* and partly due to the fact that the market rates were ruling higher than usual. The success of this experiment will cause other shipments to be made, and we are informed that Western Australia means to make a bid for a premier place on the frozen meat market. The fact that this State is from a week to ten days' voyage nearer to the markets of the Old World than the rest of Australia, should be a considerable help to her."

Antidote for Poison Plant.—The Hon. the Minister for Works has received from the Superintendent of the rabbit-proof fence a copy of a report furnished by Mr. A. W. Johnson, in charge of the northern section of the fence, dealing with an antidote (permanganate of potash) recommended by Mr. E. A. Mann, the Government Analyst, for camels suffering from the effects of eating poison plants. The most common poison plant to the east of the Oakover River is "Narrow Leaf" (*G. longifolium*), and is a deadly poison. The report from Mr. Johnson states that there have been a number of camels showing signs of Narrow Leaf poisoning lately, and in some cases the animals have had severe attacks. In all cases permanganate of potash has been administered, the dose being one teaspoonful of crystals to two gallons of water, and in every instance the recovery has been complete and the animal ready for work the next day. A further report of this and other cases will be published later on. Attention is also directed to the reports on this subject published in previous issues, and notably in the January number, 1906, of this *Journal*, and last month's issue, February.

Mulching Potatoes.—After their spring crop of potatoes has been lifted, the growers of the Southern United States usually adopt a special method if they wish to grow a second crop. The potato being a plant which requires much moisture, they conserve the soil moisture and protect it from the summer sun's heat by a thick mulch. The seed potatoes (uncut) are laid in rows on the bare soil. Then a layer, at least a foot thick, of straw, dry grass, or pine needles, etc., is put over the whole field. The potatoes, by reason of the large store of food in the tuber, can grow right through this thickness of mulch and spread out their branches and leaves above it. As no weeds can get through such a thickness, the field requires no more attention till the crop is reaped. As the young potatoes all grow between the surface of the soil and the mulch, all that is needed in reaping is to lift the latter and pick up the new potatoes from the bare soil. It is suggested that this method might perhaps be successful for growing potatoes in certain parts of the West Indies or the warmer portions of this State.

Guayule Rubber.—Considerable interest has of late been attracted to what is known as "Guayule" rubber in Mexico. The following information in regard to this plant is extracted from an article in the *Tropenpflanzer*:—The "Guayule" (*Parthenium argentatum*) is a low perennial composite about 2 feet high, with grey bark, silvery leaves, and inconspicuous yellowish flower-heads on long stalks. It is widely spread along the dry calcareous steppes of the northern part of the high plateaux of Mexico, at an elevation of 2,800 to 5,200 feet. This plant yields no latex when wounded, but the caoutchouc is in closed cells in the bark and the wood. To extract the rubber, the whole plant is dried, ground up, and as much of the woody matter as possible removed from the small round lumps of rubber which result from the grinding. The rest of the woody matter is then dissolved with hot alkali, and the rubber pressed into large, flat cakes. The product contains as much as 10 to 27 per cent. of resins and aromatic substances, and has sold for 1s. 5d. to 2s. 4d. per pound. One factory is now working, and four others are planned. It is estimated that the plants growing wild contain about 30,000 tons of this rubber, which will supply the factories for some years. Some 7 to 12 per cent. of impure rubber can be obtained from the plant.

Australian Birds.—We have received a copy of "Glimpses of Australian Bird Life." This is a booklet containing 31 original and unique photographs taken in the field from actual nature. These photographs help to show, in a distinctive and striking manner, the personal habits of many of the rarer and least known birds that live in our country. Each picture is the result of many hours of constant watching and waiting, often taken at great risk to limb or life. Birds have their whims, the predominant one being a strong mistrust of the stranger, so that he has of necessity often enough to spend a day or two in familiarising his presence to the birds. Pictures such as these for nature study work have the highest of all value. The specialists have gone straight to nature's heart, not trusting in the least to pen and pencil or imagination. Each of the 31 pictures is enhanced by a short description written by Mr. Robert Hall, F.L.S., author of "The Useful Birds of Australia," "A Key to the Birds of Australia," and other books dealing with Australian bird life. The production is a particularly artistic one, produced in booklet form, and well suited to the requirements of all nature lovers throughout the Commonwealth. Price 1s., and published by T. C. Lothian, 49 Elizabeth Street, Melbourne, to whom we are indebted for the copy received.

Rabbit Disease Experiments.—Up to the present (says the "Pastoralists' Review") the experiments on the extermination of rabbits at Broughton Island have been very successful. Dr. Danysz states that it will be fully 12 months, however, before experiments on the mainland would be justifiable. Those people who imagine that there would be any risk can feel quite satisfied that those in charge of the operations are not likely to allow a disease to be spread whilst there is the slightest doubt about it. It stands to reason that the doctor himself is not likely to risk his reputation by any hasty move. It is constantly stated by those who wish to throw cold water on the scheme that the heat of Australia will prevent the propagation of any disease. The answer to this objection, if there is anything in it at all, is that for six months out of the twelve it is very cold in the back country, during which period the rabbits are almost wholly confined to the sandhills. This being the case, everything is favourable to introducing the disease during the winter. During that time the rabbits would be so thinned down by disease that they would have little chance to do much damage in the summer. Stockowners may congratulate themselves that everything points to a successful issue, and they should see that the committee does not lack for funds.

Destruction of Bracken.—A correspondent in New Zealand writes on the destruction of bracken, as follows:—"I notice in a recent number of your paper an inquiry as to how bracken or, as it is called here locally, 'pig-fern' can be eradicated. Settlers along here get rid of it as follows, and have been very successful. A portion of my hilly land which was fern infested has been cleared by the process. Burn the fern off in March (New Zealand autumn). Have three mobs of strong young sheep. Put one mob on the fern as it starts to shoot up, leaving the other two in grass paddocks. When number one mob has been on the fern a week take them off and return them to grass, putting number two mob on to the young fern. At the end of the second week take off number two mob and put number three mob on for a week. Keep up the rotation, one week on fern and two weeks on grass. The sheep get no hurt, and the fern is kept cropped down and the ground somewhat fertilised by the droppings from the sheep. Grass with suitable grass seeds at the proper season for sowing. On flat lands, a log, rounded and having angle iron bolted on lengthwise with coach-screws, can be rolled over the fern, which, when dried, may be fired, and then treated with sheep as before mentioned. One of my neighbours had the whole of his land in fern, yet by March burning and sheep cropping as per above he cleaned it so well that there is not a vestige of fern to be seen on several hundred acres."

Fruit Fly.—Mr. W. Froggatt, the Victorian Government Entomologist, recently delivered an address to members of the Albury Fruitgrowers' Association in connection with the invasion of Mediterranean fruit fly. He said he had been around the garden orchards in Albury and Wodonga. There had been a lot of wild reports about the matter, and it had been represented that Albury was quite a seat of infection. However, he had found matters to be very much as he expected. There was a report lying in the office in Sydney now from Inspector Saunderson, written over 12 months ago, to the effect that the fruit fly had been seen in a garden in Albury. That was not surprising, as wherever Queensland fruit was imported it was inevitable that the fly would be found. However, he was satisfied that the reports were very much exaggerated. While the fly was found in a number of small gardens, he did not think any recognised orchard in the district was infested. In Wodonga things were very much worse. The fly was right through one orchard, and was also found in several gardens. Mr. Froggatt explained the new Act under which the picking up of fruit was compulsory. He also mentioned that under the new Act anyone having one tree or more was classed as an orchardist, and could be dealt with. If growers co-operated the fruit fly would soon be reduced to a nominal thing, but if the fly was not got rid of history would be repeated, and they would get no fruit. Mr. Froggatt concluded by stating that he had been instructed to come up and say that the Minister and Director of Agriculture hoped that every legitimate orchardist would act as an honorary inspector.

Character Inheritance in Sheep.—Following out the inheritance of certain characters in sheep has been the object of some experiments recently made on the part of the Cambridge University Department of Agriculture. The characters selected were horns and face colour, since obvious characters, such as these, are very much easier to follow than wool, carcase, or early maturity. The breeds selected for crossing were Dorsets and Suffolks. The cross was made each way, Dorset ram on Suffolk ewes, and Suffolk ram on Dorset ewes. The first-cross animals were the same whichever way the cross was made, all the lambs having black and white speckled faces, all the ram lambs horns, and all the ewe lambs no horns. A first-cross ram was mated with a number of first-cross ewes, and 33 second generation lambs were bred in this way, 21 being rams and twelve ewes. Of the 21 ram lambs 10 were horned, seven had rudimentary horns or scurs, and four were hornless. Of the 12 ewe lambs eight were hornless, one had a small scur, and four had large horns. As regards face colour, four lambs of the second generation have had pure white faces, three pure black faces, the remaining 28 speckled faces. Among these 28 the majority have faces which are evenly speckled all over, but in several cases there is a very marked tendency for the black colour to confine itself to the tip of the nose, or to ring round the eyes, or to both these places. It appears therefore (adds the report upon the matter) that horns and face colour in sheep (Dorsets and Suffolks) are inherited in accordance with Mendel's principles, horns being dominant in males, but recessive in females. In face colour no dominance is shown; the two colours are mixed in the hybrids, which when bred together give pure whites, pure blacks, and hybrids again.

Benefits of Bees.—It is an undisputed fact that the blossoms of most of our fruits are self-sterile. They require some outside agent to complete the fertilising. In some instances all the fertilising agent necessary is the wind, but this is true, I think, to a very limited extent with our fruits, owing to the adhesive nature of their pollen. They require an assistant, or servant, as it were, to do this fertilising for them, and almost universally this agent is found in the insect world. In nature all life is so proportioned that each individual fills its natural place, but when man enters with his aggressions and progress, conditions are changed. He sows hundreds of acres of wheat and the Hessian fly breeds and multiplies faster than its natural enemies, and so damage the crop. He plants thousands of acres of fruit, and the pests on this fruit, imported with it from other countries, and in the absence of their natural enemy, thrive and multiply. They become such a pest that the fruit grower must fight them, and yet, in nature, there was provided a remedy to hold them in check. So, then, with the multiplying acres of fruit some artificial means of assisting in its fertilisation becomes necessary, and the most efficient and easily installed agent is the honey bee. If we were certain of clear weather during the entire time the trees were in bloom we would not worry, but, unfortunately, it often happens that one variety of fruit will only see a few hours of fair weather while in bloom. This was true the past spring in regard to a peach orchard standing beside the plant introduction garden at Chico, and under the writer's observation. The time of bloom happened during a prolonged cold storm, and the blossoms saw less than a half-day of sunshine. The insects on this bloom numbered four bees to one of another kind, not because there were more bees than other insects, but because the bee is the strongest insect that does this work, and will fly during inclement weather when other insects are unable to do so. The progressive fruit grower of to-day is the man who does not leave a straw unturned to secure the best possible yield in his orchard. He is beginning to realise that in the past he has neglected to assist nature in this respect and so lost crops that might have been profitable. The blossoms were placed on the tree for a reason, and the nectar was placed in these blossoms for no other reason than to attract the insects, because the tree wanted assistance to enable it to produce its fruit.

Grass Seed Catalogue.—On going to press we received a copy of Messrs. Gardner Bros.' catalogue of Grass and Farm Seeds. Several pages are devoted to cultivation notes culled from reliable sources, and written by a practical man, while the list contains the names and prices of all the best and latest seed.

THROUGH THE KIMBERLEYS.

By R. E. Weir, M.R.C.V S.

Owing to the light sandy nature of the country, travelling by means of vehicle to Derby, *viâ* the telegraph line, is usually difficult, but when this drawback is accompanied by a scarcity of water on the route it may then become a hardship of a somewhat trying nature. Such was our experience as although we obtained all information possible before leaving the Oscar, we failed on one occasion to find a supply and besides having to pass the night without water, we had to retrace our steps several miles to secure a supply which would carry us over a long dry stage of about 40 miles. This was more trying on our tired steeds than ourselves, and on reaching the 67-mile where water and good feed were obtainable, a well-earned rest of two days was secured. Before continuing our journey we ascertained that this particular locality had been chosen as a suitable site for artesian boring, and that the plant was then on the way to start operations. Advice has since been received that at a depth of 1,000 feet a supply of 100,000 gallons daily of good water was met with. This will not only mean a great boon to travellers, but from a stock-raising point of view will be of material gain to the district, and particularly so to Mr. Davis, the proprietor of Kimberley Downs Station comprising some 2,000,000 acres. An improvement in the country occurs from this part to the Meda; the Pindan is displaced by richly grassed Mitchell flats, some of the choicest areas had the appearance of being suitable for cereal-growing, and it is possible that at no distant date wheat may there be cultivated on a large scale. As the Meda homestead (25 miles from Derby) was approached evidence of the dry season became particularly noticeable, the pasture was scant and water supply confined to muddy dams which were rapidly evaporating. At the homestead we were hospitably received by Mr. Russ, the manager, who is acting on behalf of Messrs. Emanuel & Pearse, the owners of a leasehold of 920 square miles of country with a carrying capacity of 19,000 head of cattle. The area is chiefly made up of large open flats well grassed with Mitchell and bundle-bundle, the remainder being Pindan, but the country has yet to be tapped with artesian bores before its full feeding value can be rendered available. The dry condition of the country was then causing the manager much anxiety, and I was not surprised to find from him that others were already removing their stock on to new country beyond the Leopolds. We met one of those large mobs travelling from the Yeda station, and from their poor appearance it was evident that a change to better country would prove advantageous. Another striking feature was the extent to which mixed breeding had been indulged in. This practice has been more or less commonly carried out amongst the West Kimberley herds with degenerate results, not only from a lack in uniformity but also from a commercial point of view. Crossbreeding may be advantageous when undertaken with the object of securing a certain type of animal, but when this is carried to excess, and especially when various breeds have been utilised for the purpose, the herd is certain to deteriorate to such an extent that many years may elapse before a standard of perfection is again secured. On arriving at Derby we found the inhabitants of the town in a somewhat excited condition in consequence of a rich deposit of silver and copper having been found in the district. The early reports of this find were of a favourable character, but as developments took place the payable nature of the ore declined and the work was subsequently given up as altogether unprofitable. As two days were at my disposal before the s.s. "Moonta" would arrive for a consignment of stock I had an opportunity of resting from the long overland journey, and at the same time renewing acquaintance with a few friends whom I had previously met in other parts of the State, as also noting the improvements which had been effected in the town during the interval of eight years since my previous visit. The buildings are principally constructed on each side of a long roadway, and as the majority are business premises it entails unnecessary travelling to get from one end to the other. From the end of the roadway a tramline two and a-half miles in length runs down to the jetty where a good natural harbour is provided, and which accommodates shipping of deep draught at full tide. The chief products of the district are live stock and wool, and during the shipping season, which is yearly on the increase, a busy time is experienced by the townspeople as the result of the presence of those interested in the trade. With the institution and expansion of chilling works the town of Derby will also benefit considerably, as this place will undoubtedly become a large centre for export to the mutual benefit of all concerned. The arrival of the s.s. "Moonta" and the shipping of 500 head of cattle necessitated bidding farewell to many kind friends met with in the town, and after a pleasant run of seven days the well-known port of Fremantle once again came in view, and thus the long but not unpleasant journey ended.

FRUIT FLY.

By J. S JEFFERSON, Inspector.

As this pest is at present causing trouble and anxiety to the fruit growers of this State, some information about it may be of interest and use to readers of the *Journal.*

The species known here is the Mediterranean fruit fly, and takes its name from that sea on which its original home borders. The fly is about half the size of an ordinary house fly, shorter and more squat in body, lighter in colour, and having its wings more extended and drooping. The male fly is broader in proportion to its length than the female. The fruit fly is very active in its movements, and is seldom noticed in the winged state except when it is very numerous. So far as known, the Queensland fruit fly, which is longer in body than the Mediterranean species, does not exist in this State. A few words as to the history of the fruit fly will make clear the difficulty of coping with the pest. The mother fly deposits her eggs by means of a hollow, pointed tube, called the ovipositor, inside the growing fruit. Under ordinary summer conditions these eggs hatch into grubs almost immediately, and the grubs in their turn, revelling in the soft pulp of the fruit, through which they force their way inwards, eating and growing as they crawl, soon cause the fruit to decay and fall. The grubs (larvae), which at first were pure white, now turn a creamy yellow colour, and, emerging from their present habitat, enter the ground, where they remain in chrysalis state until they again emerge as flies, ready to continue the work of destruction. Hence it will be noticed that during the egg and larval stage the insect is protected, against spraying or fumigation by the pulp and skin of the fruit, and during the pupa stage no known treatment can be applied to the ground which will kill the insect without injuring the tree roots.

The wide range of fruits liable to attack by the fly furnishes one of its chief dangers. I have found it in every variety of fruit grown in this State, with the exception of nuts, lemons, and grapes. Its presence in one or two grapes has, I believe, been once reported, but although I have examined carefully ripe grapes close to badly infested trees, I have never yet been able to detect its presence in the former. I have found it in melons. The insect has the power of hibernating (living through the winter), and that without food. Several growers state that it has shown itself in their late peaches only, although their orchards contained large quantities of earlier fruits quite free of the pest. I am inclined, however, to believe that the fly had bred unnoticed in the earlier fruits, and it was its brood which was evidenced in greater numbers in the later fruits.

Like the codlin moth, the mother fly shows a very marked instinct in her choice of a home for the coming brood. In fact she hunts the orchard over in search of a suitable fruit A good sweet peach seems to be her heart's delight. She has a decided preference for the more sugary fruits. This is the reason why the Adam's fig and the earlier and more watery peaches are avoided, while the sweeter apricot, sugary figs, nectarines, the midsummer and late peaches, pears and the softer and sweeter varieties of apples are attacked. When the flies are plentiful in an orchard, and food scarce, they will attack perfectly hard fruit, such as green quinces, peaches, and apples; in fact, fruit so unsuitable that sometimes the young larva dies immediately after hatching. When sending fruit away from an infested orchard it is advisable, where possible, to pick it a little hard, place away in a cool place for a couple of days, and re-examine before shipment. Fruit which at time of picking had just been punctured and only contained eggs will have by this time shown signs of maggots at work. The usual indications of the grub's presence is a tiny brown puncture and a soft depression immediately underneath this. From four to a dozen eggs are usually inserted in each fruit attacked.

When a tree is badly infected the fruit should be stripped at once. A portion of the fruit is by this means saved, and the risk of any larvae getting to the pupa state minimised.

Some good results have recently been obtained by using kerosene to attract and kill the flies. The top of a mustard tin about ¾in. deep, tacked on to or hung in the branch of an infected tree, and containing kerosene, answers the purpose. Some people say that if the cup is slightly tipped, so as to leave a small portion of the bottom uncovered, it does better work. A specially prepared mixture, under trial by the Department of Agriculture, is also said to do good work. But the most effective treatment yet proved is the daily destruction, by boiling or burning, of all infected fruit found either on the trees or ground. Occasionally, but very seldom, the larva escapes before the fruit drops.

As to a parasite, until this has been introduced and established it behoves growers, in self-protection, not to relax efforts in checking and, if possible, eradicating the pest. And in this connection it may be some encouragement to growers whose orchards have recently been attacked to mention three instances recently come under notice where, by the use of prompt measures, carefully carried out, the fruit fly appears to have been completely eradicated.

Mr. Alfred Crampton's orchard at Harvey. Not seen for four years.

Mr. Alfred Chapman's orchard, Upper Preston. Not seen for two years.

Mr. Isaac Lowe's orchard, Harvey. Not seen this season.

The larvae of ferment flies and scavenger beetles are frequently present in fallen and decaying fruit, and are often mistaken for fruit fly larvae. In cases of doubt it would be well to submit specimens to one of the officers under "The Insect Pest Act." The chrysalis is egg-shaped, but more elongated, nut-brown in colour, and about one-sixth the size of an ordinary field pea.

One grower, whose orchard became infested this season, tapped some useless water melons growing in his orchard, and successfully used them to trap the fly. I found the larvae deposited in the holes.

A fact worthy of note, especially by exporters, is that cold storage, spreading over a few weeks, kills the fruit fly larvae.

Fruit Fly Exterminator.

The following notes are taken from the orchard inspector's report on the results of experiments made with the "Fruit Fly Exterminator," a specific recently sent into the Department for trial, and which promises to be of very great value to the fruit-growers of this State.

On the 14th of last month a visit was made to certain orchards in the Guildford District. The trees to be experimented with having been selected, twigs of red-gum were sprinkled with the solution and hung in the branches. From what could be seen, the fly was very soon attracted to the stuff—they would alight on it and after taking a sip would fly away again.

On the 25th inst., we placed two small shallow tins partly filled with the exterminator in a fig tree in Mr. F. Jeck's orchard and watched them for about 40 minutes, during which time 50 fruit flies came and tasted the mixture, and although they did not fall down dead into the tin, I am satisfied from previous experiments that they would expire within a very short time through the effects of the poisonous exterminator. I noticed eight fruit flies in one of the bushes that had not been sprayed since the 21st, six of which had their ovipositor turned upwards and exuding a small quantity of white fluid; these flies had evidently tasted the solution still on the dry leaves, and seemed to prove the fact that one taste prevents them from depositing any more eggs.

We are quite satisfied with the efficacy of the Fruit Fly Exterminator, and fully believe that if the system of bush-spraying and small shallow tins partly filled with the solution were placed in the trees and kept well looked after, any orchard can be kept practically free from the pest.

FRUIT FLY AND OTHER PESTS.

At the last meeting of the Nelson Agricultural Society a letter was read from the Sussex District Association to the effect that the question of the potato moth and the best means of combating the pest would be discussed at the next meeting of the Association, when they would be glad if a delegate from the Nelson Agricultural Society could be present.

Mr. Moultan thought it would be a good idea to have imported potatoes inspected. There were quite enough diseases to fight as it was. He proposed that a delegate be sent.

Seconded by Mr. J. Allnutt and carried.

Mr. J. Allnutt was appointed delegate to the Conference.

Mr. J. Allnutt said the introduction of pests was becoming a serious matter. The fruit fly had now got as far as Donnybrook. In order to save the extension of the pest, they should try and get the Inspector or the Government to have a more rigid inspection of the fruit. Oranges and other fruit were sent both to Greenbushes and Bridgetown, and unless the fruit was inspected the probabilities were that the fly would be in Bridgetown before long. The fly was one of the greatest pests with which they could be faced. As yet no means had been found to adequately combat it. He had hoped to have heard a discussion as to the best means of preventing its spread to the district. He thought for one thing that the Government should pass a law to the effect that no empty fruit cases should be sent back to orchardists, and another law should be passed that all fruit should be inspected.

The President said that it appeared to him that the matter of prevention was in their own hands to a great extent The idea of inspecting all fruit that came from Perth was impracticable, as this would mean that every consignment would have to be inspected. An inspector would have to be permanently employed. Really the question resolved itself to the growers refusing to take any empty cases from the townships of Greenbushes or Bridgetown to their orchards. Oranges and bananas were bound to be imported, and in the past local fruit growers had been glad to get their cases back. The cases were often very little damaged, but there was no doubt that this was an excellent way of spreading the fruit fly.

Mr. Allnutt said he had not heard of late of anyone having their cases returned.

The President said that perhaps they had not been returned from Perth, but they had been returned from Greenbushes and Bridgetown. He was guilty of doing it himself from Greenbushes last year. He, however, always declined to receive cases back from Perth, but several growers did so last year. If they were more careful in that respect they might stave off the fruit fly for a long time.

Mr. Allnutt said in Bunbury only the other day the Inspector found the fly in Mr. Teede's orchard and ordered him to pick all the fruit off and destroy it. The trouble is supposed to have arisen from Mrs. Spencer having a case of beautiful apricots sent from Pinjarrah. When they were opened maggots were found all round the stones. She threw them out in the open yard for the fowls to eat, and it is surmised that the fruit fly spread from that.

Mr. Russell thought that they should ask that the inspection of fruit in the salesroom should be more strict, and that the District Inspectors should be told to warn the people of the danger of taking back the empty cases. It was a danger to themselves as well as their neighbours. The Inspector should have the power to make anyone destroy the fruit affected, or, if the grower did not intend to look after his orchard, the Inspector should have power to make him destroy the trees. The best way was to write to the Director of Agriculture and ask him to shake the Inspectors up.

Mr. Williams said that a short time ago two Inspectors were dismissed. There was an outcry at the time, but some people seemed to think that the officers were doing no good. People in Perth and in other towns were very casual in such matters. When Mr. Leake was in favour of apples coming in they supported him because they were in favour of cheap fruit, and they were in favour of cheap fruit to-day. The troubles of the orchardist did not concern them. If the hands of the Director of Agriculture were so strengthened as to enable him to increase his staff it would be better for all concerned. He felt sure that if such a movement took place Mr. Mitchell would increase the staff. At the present time the Inspector in the Blackwood district was a first-class man, but they wanted more like him.

The President said that the danger of the fruit fly spreading did not arise so much from the fruit in the salesrooms as from fruit sent from infected districts in the country districts. People in infected districts would not send to the salesrooms because of the inspection under which they knew the fruit would have to pass.

Mr. Willmott said that it was impossible for the inspectors to do justice to the enormous extent of country which they now had to cover. It was far too large. The only thing he could suggest was that the staff of inspectors should be increased.

It was unanimously decided that the Minister for Agriculture be urged to increase the staff of fruit inspectors, and that the inspection of fruit should be more stringent.

Mr Wickens Interviewed.

On Monday morning Mr. Wickens, the Orchard Inspector for the district, was interviewed on the appearance of the fruit fly on the Preston. He said that the possibilities of this pest had kept him exceptionally busy of late, and he had been at work regularly from six o'clock in the morning while daylight lasted. Everything in the shape of a pest, from aphis to fungus, which appeared near stone fruit had of late been reported to him as fruit fly. He could not as yet speak unreservedly on the subject, as he had only just made his report to the Department, but he thought that without any breach of discipline he could repeat what was common knowledge, namely, that he had detected the appearance of the fly in five orchards on the Preston. One of these, Mr. Waters', was of 70 acres, and another, Mr. Lyons', was of 20 acres. The appearance was very slight in one case, only one single fruit being affected; and in the other only two fruit having been touched by the fly. He did not mean fruit trees, but single samples of fruit.

When asked whether the appearance of the fruit fly, unless it could be combated, threatened the destruction of the fruit trade of the Preston, Mr. Wickens said he did not anticipate anything like so serious a result. He felt sure that, taken in its infancy, the appearance of the fly could be successfully fought. After all, so far, the outbreak was very slight, and could not have been detected at all except by someone who was well acquainted with the fly.

Asked how the fly was thought to have reached the Preston, Mr. Wickens said that some of the settlers thought it had come from Collie by means of hawkers' carts, but he personally thought the balance of circumstantial evidence pointed to the possibility of the fly having been introduced to the district from Donnybrook. He would, however, have formed more definite conclusions on this subject when he had completed his investigations.—*The Southern Times.*

POULTRY NOTES.

ANIMAL FOOD FOR POULTRY.

By Frank H. Robertson.

The results are to hand of a number of experiments relating to poultry which have been made at various times at the Government Experimental Stations in the United States of America and Canada. They have all been published in pamphlet form.

The first one dealt with is with reference to the value of meat meal as compared with fresh meat. Of six tests made three were in favour of the former and three of the latter, thus placing both on an equal footing.. This is satisfactory information to poultry breeders in this State, as artificially prepared animal foods are now largely coming into use,owing to the difficulty experienced by most poultry keepers in obtaining a sufficient quantity of refuse meat from the butchers ; even then the price is very high, ranging from 1s. to 1s. 6d. each for bullock's liver and 3d. for sheeps' and when obtainable it has, as a rule, to be carried from the butcher's shop, taken home, then boiled, and minced or cut up. All this entails considerable trouble and expense. The dried animal foods, of which there are several kinds lately retailed in Perth, come as a great boon to poultry keepers, as they provide a handy and convenient form of animal food which is always available, and little work necessary to prepare it for use. The person who keeps only a few birds in the back yard can generally find sufficient animal food in the scraps from the table, but when some hundreds of birds have to be catered for, the question forms quite a different aspect. This was very forcibly placed before the writer when making provision for the birds at the Subiaco competition; great difficulty was experienced in obtaining an adequate supply from the butchers, and a visit to the abattoirs, some miles out of Fremantle, was quite unproductive of results, as none was obtainable there; even the blood could not be bought, it being used chiefly for manure, although it was pointed out that a much better price could be realised if it were prepared for feeding poultry, but all to no avail; and at the present moment we are importing blood meal from Queensland.. Some day, perhaps, our meat magnates will wake up to the fact that it will pay them to prepare this slaughter-house offal and place it on the market, and at the same time provide poultry keepers with a valuable form of animal food for their stock.

Blood meal is the highest of all foods in albuminoids, as shown by a recent analysis supplied to the Department by Mr. Mann, the Government Analyist, viz. :—

Moisture	9.95
Fats	1.98
Ash	6.55
Albuminoids	81.52

The most usual animal food used for poultry, viz., bullock's and sheep's liver show albuminoids, 20 and 23 per cent. respectively, also according to Mr. Mann's analysis. It will thus be seen that one pound of blood meal is equal to nearly four pounds of liver, but as the fresh livers cost about 1½d. per lb. (14s. cwt.), and the blood meal is bought at 15s. to 17s. 6d. cwt., it will be seen that the blood meal has a great advantage over the fresh meat in point of cost. There is, however, one fact to be borne in mind, and that is the question of assimilation and palatability, as unless the blood meal is of first-class quality it is not liked by poultry so much as the fresh meat, in fact, some samples of blood meal remind one of a boiling-down establishment when soaked in hot water; but I have seen a sample of local production which was perfectly odourless and much appreciated by the fowls, but with the manufacturer of this last-named blood meal it is a case of can but wont, as, like the three large slaughter-house proprietors already mentioned, it is presumed that other than the present form of profit-making do not offer sufficient inducement to extend their operations in other directions. Blood meal is not hard to produce in a small way, and has frequently been made by the writer on this farm when more offal was on hand than wanted for immediate requirements. The fresh blood is poured into a kerosene tin, to which is added an equal part of boiling hot water, and a few minutes boiling suffices, but if left on the fire unattended the blood is very liable to get burnt. It is then taken out in large solid lumps, these are broken and squeezed dry and spread out in the sun to dry. The stuff should be turned every day and soon becomes quite hard, and can be kept for future use. If to be reduced to a meal it should be passed through a grit mill. Blood prepared in this manner has no bad smell.

On farms where a number of hands are kept the killing of sheep is of frequent occurrence. The blood should always be saved and boiled as above described. Here, on the Narrogin State Farm, we are well favoured in that respect, as there are quite 40 persons to be provided with meat. We boil the blood in the evening, and next morning pass it through a mincing machine specially made for use on poultry farms, this being quicker and better than breaking up by hand; the boiled livers and lights are also minced in the morning. The sheeps' heads are also boiled with the livers, and make excellent soup to moisten the mash. The heads are boiled whole, as it is found that splitting them makes too many small bone splinters, which are a source of danger if left in the mash. Heads allowed to simmer for about three hours have all the nourishment taken out of them, the jaw bones come asunder, and the skin peels off; nothing remains but bone and little food.

There is another source of meat supply which is generally allowed to go to waste on most farms, viz.., some animal which has had to be shot, or met with an accident. Instead of burying such, the best plan is to cut the flesh in long thin strips and hang over a wire fence to dry, which, if the weather is warm, cures in a week or ten days Meat prepared in this manner is known as Biltong in South Africa, and was brought prominently under notice as a food largely used by the Boers during the late war. After drying, it can be put away for use when required. The best way to prepare it is to boil thoroughly and then mince.

Green bone is no doubt an excellent form of animal food, but poultry keepers in general are paying less attention to this form of animal food than formerly on account of the hard work it entails. Where only a few fowls are kept the labour is not great, but can be rather considered as good exercise for the city man who has been at his desk all day, but to the poultry farmer who has several hundreds of birds to feed the cutting up of 20 to 50 lbs. of bone is no light task. If a gas or electric motor is used well and good, in fact, such almost becomes a necessity where a large number of poultry are kept, not only for cutting bone but many other things, such as crushing grain, pumping water, turning a grindstone or lathe, etc., etc.

When using green bone care should be taken not to cut up any which has become tainted, better burn it. If more bones are on hand than can be cut up at once, cut off all meat and dust them well with fine pollard ; the same thing can be done after the bone is cut up. Mix a good supply of pollard with the bone and spread out in shallow dishes, and expose to as much sun-heat as possible, turn over every day so that all moisture is absorbed ; bone can be kept good a long time in this manner. It will not keep if closed up. I tried tinning some on one occasion, but it was a failure.

The natural conditions of soil, climate, and vegetation of most parts of this State are such that insect life is often very deficient, therefore the instructions given in English poultry books are not applicable to this part of the world, particularly as regards the supply of animal food which can be picked up by fowls on a free range, therefore the animal foods have to be supplied in some form or other, and that success as regards egg-laying qualities can thus be produced is amply verified by the excellent results which have been obtaind at the various Egg-laying Competitions.

Now the question arises as to what quantity of animal food should be given. To err in giving too large a quantity is not of frequent occurrence in this State, and the amount given depends on the character of the birds to be fed. For instance, cockerels for show or stock purposes would require but little. Ducks want a liberal supply, more than is given to hens. Growing chickens and pullets want regular supplies, and laying hens should, of course, have a liberal supply. An 8lb. bullock's liver in a mash for 200 laying hens daily would be a forcing amount for egg-production, and in giving it an ample supply of greenstuff would have to be provided, but for the ordinary poultry keeper who cannot, as a rule, get a regular supply of greenstuff it would probably be found that 8lb. of liver three times a week would be ample to give an excellent egg yield. In hot weather it is often noticeable that fowls dislike too much meat, and the proportionhas to be considerably reduced, and if highly concentrated manufactured animal foods are given such as beef scrap or blood meal, the quantities would be reduced to half or one-third the weight of fresh meat, according to their analysis. Or, putting it in another form,a strong egg-producing diet would consist of 15 per cent. of animal food, 20 per cent. of green feed, and 60 per cent. of grain and meal, viz., wheat, oats, bran, and pollard. A ration of this sort would come out at a ratio of about 1-4.84, that is, one part of albuminoids or egg-producing and flesh-forming food to 4.84 of carbo-hydrates, or heat-giving and energy-producing qualities. A narrow ration of this description could be scientifically produced by using a large percentage of leguminous vegetable foods, such as peas and beans ; but actual practice bears out the fact that albuminoids of this description do not give the results attained by animal food in some form or other.

EGG-LAYING COMPETITION.

NARROGIN MONTHLY RECORD.

The following are the results of the egg-laying competition at the State Farm, Narrogin, for the ten months ended with February last. There are still two months to run:—

	Breed	Owner.	Total for Month.	Total to Date.
1.	Brown Leghorns	E. E. Ransford	117	1,118
2.	Silver Wyandottes	A. M. Neitchke	78	1,022
3.	White Leghorns	Mrs. A. Bristow	70	1,007
4.	Brown Leghorns	Mrs. R. A. Dusting	107	969
5.	White Leghorns	F. Piaggio	98	962
6.	Do. do.	C. W. Johnson	74	937
7.	Do. do.	Aveley Yards	86	901
8.	Buff Orpingtons	A. H. Hilton	60	899
9.	White Leghorns	Miss M. Parker	90	883
10.	White Leghorns	A. F. Spencer	87	839
11.	Silver Wyandottes	Miss Buttsworth	67	832
12.	Brown Leghorns	J. D. Wilson	90	809
13.	White Leghorns	J. Handley	69	809
14.	Do. do.	F. J. Williams	82	798
15.	Black Orpingtons	Sparks & Binnington	65	787
16.	Silver Wyandottes	G. W. G. Lizars	71	778
17.	R.C. Brown Leghorns	Adelaide Yards	60	755
18.	White Leghorns	J. E. Tull	82	742
19.	Golden Wyandottes	W. J. Craig	73	739
20.	Black Orpingtons	Perth Yards	65	730
21.	White Wyandottes	Mrs. S. J. Hood	55	727
22.	White Leghorns	R. G. Flynn	58	719
23.	Do. do.	O. C. Bath	70	708
24.	Do. do.	G. Oneto	66	645
25.	R.C. Brown Leghorns	E. Krachler	40	644
		Totals	1,877	20,844

SUBIACO MONTHLY RECORD—FEBRUARY.

[Commenced on July 1. To close on June 30, 1907.]

FOWLS.

Six hens in each pen.

	Owner and Breed.	1907. Feb.	Total for eight months.
1.	Sunnyhurst (S.A.), *W. Leghorn	129	1,132
2.	A. H. Padman (S.A.), *W. Leghorn	99	1,020
3.	S. Craig, *W. Leghorn	117	998
4.	E. Garbett, W. Leghorn	107	937
5.	J. D. Smith, *W. Leghorn	89	923
6.	Ryan Bros., *W. Leghorn	105	922
7.	G. W. G. Lizars, *W. Leghorn	106	922
8.	Ericville Egg Farm, *W. Leghorn	100	920
9.	E. Palmerston, W. Leghorn	121	906
10.	J. R. Parkes, Brown Leghorn	106	906
11.	Austin and Thomas, W. Leghorn	101	904
12.	F. Whitfield, Brown Leghorn	96	897
13.	E. Fitzgerald, W. Leghorn	103	897
14.	Bungalow Farm, Brown Leghorn	99	883
15.	A. H. Padman (S.A.), *S. Wyandotte	70	881
16.	Bon Accord, W. Leghorn	107	880
17.	W. J. Clarke, Brown Leghorn	76	868
18.	F. Piaggio, W. Leghorn	97	864
19.	A. F. Farrant, Partridge Wyandotte	76	848
20.	G. M. Buttsworth, *W. Leghorn	91	843
21.	J. W. Buttsworth, *W. Leghorn	98	839
22.	Mrs. McGree, *W. Leghorn	81	834
23.	C. W. Johnson, *W. Leghorn	97	832
24.	W. Snowden, Brown Leghorn	86	814
25.	F. T. Rowe, *Black Orpington	74	812
26.	Adelaide Yard, W. Leghorn	88	805
27.	Bungalow Farm, *W. Leghorn	85	794
28.	F. Whitfield, *W. Leghorn	82	782
29.	Mrs. Hughes, *R. C. B. Leghorn	94	778
30.	A. Snell, *Brown Leghorn	55	764
31.	E. Hutchinson, *Minorcas	85	748
32.	H. Jones, W. Leghorn	53	747
33.	A. R. Keesing, Minorcas	72	742
34.	C. Attwell, *S. Wyandotte	65	742
35.	A. S. B. Craig, *W. Wyandotte	67	739
36.	W. Wade, W. Leghorn	80	739
37.	H. M. Kelly, *G. Wyandotte	91	731
38.	J. White, Brown Leghorn	70	725
39.	R. G. Flynn, W. Leghorn	69	723
40.	B. Jones, *S. Wyandotte	69	710
41.	O. K., *Black Orpington	60	710
42.	L. Meatchem, *G. Wyandotte	63	708
43.	C. R. Roberts, *W. Leghorn	72	705
44.	Geo. Bolger, *Black Orpington	80	699
45.	Perth Yard, W. Leghorn	67	689
46.	Ericville Egg Farm, *Black Orpington	36	678
47.	E. A. Newton, W. Leghorn	78	675
48.	Honnor and Forbes, R. C. W. Leghorn	80	671
49.	J. W. Buttsworth, S. Wyandotte	75	667
50.	F. Mason, W. Leghorn	65	663
51.	W. Snowden, S. Wyandotte	61	658
52.	C. L. Braddock, S. Wyandotte	65	652
53.	C. Crawley, B. Orpington	72	646
54.	Glen Donald Yard, G. Wyandotte	57	645
55.	R. G. Smith, W. Wyandotte	65	641

* Male birds were placed in these pens on August 1.

FOWLS—*continued.*

Owner and Breed.	Feb.	Total for eight months.
56. A. Coombs, S. Wyandotte	56	630
57. J. S. Miller, S. Wyandotte	69	605
58. H. M. Kelly, *B. Orpington	65	602
59. Mrs. McGree, W. Wyandotte	55	588
60. A. Savage, Minorca	43	573
61. H. H. Wegg, G. Wyandotte	65	570
62. Jas. Kirk, G. Wyandotte	50	560
63. J. E. Redman, S. Wyandotte	45	548
64. J. B. Pettit, S. Wyandotte	53	527
Total	5,053	49,061

DUCKS.

Four in each Pen.

Owner and Breed.	Feb.	Total for eight months.
1. R. A. Dusting, *Indian Runner	80	808
2. Austin and Thomas, *Indian Runner	68	734
3. Adelaide Poultry Yard, Indian Runner	71	690
4. Miss E. Parker, Indian Runner	75	679
5. F. T. Rowe, Indian Runner	63	675
6. F. D. Vincent, *Indian Runner	91	661
7. A. Snell, *Indian Runner	67	654
8. C. E. Close, Indian Runner	67	642
9. Aveley Poultry Yard, Indian Runner	83	613
10. E. A. Newton, Indian Runner	49	601
11. C. W. Johnson, *Indian Runner	72	594
12. Mrs. L. Mellen, *Indian Runner	36	588
13. Ericville Egg Farm, *Buff Orpington	21	586
14. G. Stead, *Indian Runner	59	578
15. Bon Accord, *Buff Orpington	46	567
16. J. B. Pettit, Indian Runner	75	553
17. J. R. Parkes, Indian Runner	53	551
18. S. Craig, Indian Runner	51	544
19. F. Piaggio, Buff Orpington	71	541
20. W. Snowden, *Buff Orpington	52	533
21. Perth Poultry Yard, *Buff Orpington	30	525
22. Sargenfri (S.A.), *Buff Orpington	30	417
Total	1,310	13,334

It will be noticed that the leading pen at Narrogin (Mr. Ranford's Brown Leghorns) has now a substantial lead, as they are at time of writing still in fine fettle and have every prospect of putting up a first-class record, but one never knows as the moulting season is now on us and seriously affects the egg yield of many pens.

This competition, which terminates on the 30th April, will not be renewed.

The birds at Subiaco are doing very well, the two leading pens which are sent by South Australian breeders continue to show marked excellence, the first one, viz., Sunnyhurst, has, so far, made an extraordinary egg yield, being more than 100 in advance of the second pen. The leading local pen, also White Leghorns, is owned, and, I believe, bred by Mr. S. Craig, a well-known Belmont market gardener, who also combines poultry farming on a rather extensive scale, and makes it a very profitable adjunct to vegetable-growing.

The Indian Runner Ducks are also laying remarkably well, the leading pen putting up a great record—quite equal, if not exceeding any of the Eastern State competitions.

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* Male birds were placed in these pens on August 1.

The proprietors of the *Australian Hen* have just published a very useful account book for poultry breeders, with which is incorporated complete results and statistics of all Australian Laying Competitions which were completed last year.

The first competition was held at Hawkesbury from 1st April, 1902, to 31st March, 1903. This was won by Rose-Comb White Leghorns with a total of 1,113 eggs—this was considered at that time a very good record, but as an instance of what great advancement has been made since then, the leading pen at Narrogin has laid 1,118 eggs and two months to continue yet.

The final summary of all competitions affords valuable and interesting data. Rose-Comb Minorcas head the list with an average of 203.67 per bird per year, but as this refers to only one pen it cannot be taken as a reliable guide; but taking the birds of which the largest numbers were entered we find the order is as follows:—106 pens of White Leghorns averaged 171.99 (or say 172); Silver Wyandottes, 92 pens average 165.65; Black Orpingtons, 107 pens 165.61. The average of 172 is a long way from the200 hens which so many persons are looking for, and proves that although the 200 average is quite a common thing in egg-laying competitions, it is far above the ordinary run.

The following is a copy of the summary referred to:—

No. of Pens.	Breed.	No. of Birds.	Total.	Total Average per Bird per Year.
1	R.C. Minorcas	6	1,222	203·67
9	R.C. Brown Leghorns	54	9,862	182·63
7	R.C. White Leghorns	42	7,448	177·33
4	Imperials	24	4,239	176·62
1	Rode Island Red	6	1,056	176·00
6	Black Hamburgs	36	6,254	173·72
1	Faverolles	6	1,040	173·33
106	White Leghorns	636	109,385	171·99
2	Pile Leghorns	12	2,055	171·25
23	Brown Leghorns	138	23,104	167·42
92	Silver Wyandottes	552	91,441	165·65
107	Black Orpingtons	642	106,324	165·61
13	Andalusions	78	12,853	164·79
13	Langshans	78	12,706	162·89
9	Buff Wyandottes	54	8,514	157·67
2	Jubilee Orpingtons	12	1,811	150·92
24	White Wyandottes	144	21,692	150·64
14	Buff Leghorns	84	12,648	150·57
1	S.S. Hamburgh	6	897	149·50
23	Golden Wyandottes	138	20,342	147·40
24	Minorcas	144	20.951	145·49
34	Buff Orpingtons	204	29.500	144·61
1	R.C. Black Orpingtons	6	851	141·83
6	Anconas	36	4,948	137·44
2	White Orpington's	12	1,631	135·91
1	Birrilees	6	810	135·00
1	Silver P. Wyandottes	6	789	131·50
1	O.E. Game	6	777	129·50
1	White Plymouth Rock	6	775	129·16
4	Silver Campines	24	2,860	119·17
2	Partridge Wyandottes	12	1,284	107·00
1	Black Spanish	6	626	104·33
536		3,216	520,695	
	General Average per Bird per Year ...			161·91

THE POULTRY INDUSTRY IN ENGLAND.

Mr. Edward Brown, the well-known English authority on poultry, as Secretary to the National Poultry Organisation Society, issues a report annually which is always well worth perusing, a copy of which I extract from the *Feathered World*:—

THE POULTRY INDUSTRY IN 1906.

By Edward Brown, F.L.S.

Increasing supplies, well-maintained prices, and improved methods are terms which may be fitly employed in respect to the poultry industry during the last 12 months. To that extent we can regard the progress made as most satisfactory. The results of work and effort are becoming apparent. Only those who from intimate connection with past and present are able to compare one with the other can realise the growth of poultry-keeping in this country. Developments in some directions are very marked, in others to a lesser extent; but that there is progress all round cannot be questioned.

In not a few English counties the increase in the number of fowls kept is considerable, more especially where adjacent to the great centres of population, where, with a huge and unsatisfied demand, more especially for eggs, in the immediate locality, the marketing problem does not present itself, and prices are highly remunerative. Under such conditions combination for this purpose would be a waste of effort.

Scotland has been slow to move, but evidently the time has come for anticipating considerable developments north of the Tweed. During the year under review, we have had numerous communications from all sections of North Britain. In a few districts farmers are largely augmenting their stock of poultry and are adopting progressive methods with encouraging results. Marketing is one of the main problems, and pioneers in co-operative poultry societies have had considerable difficulties to face, due to an inherent disposition to hold aloof from new systems. With determination these are being overcome.

Wales still lags behind, though the foundations are being laid. No part of the kingdom has greater opportunities, due to the great number of smaller farms, but the realisation of these is far away as yet.

Ireland continues to advance, but complaints are still received as to the manner in which the produce is shipped. It is apparent, however, that a very great improvement has taken place in the quality of the fowls kept in that country, and with more expeditious marketing of eggs they would command better prices.

Whilst steady progress can be reported on all sides, this is chiefly in the direction of poultry-keeping as a branch of general agriculture, which must ever be the main source of home supply. If the efforts now put forth to increase the number of small holdings in the country in order to rejuvenate our rural population, and the affording of fuller opportunities by colonisation of land which is now but partially cultivated, succeed, as all must hope, the number of fowls kept will advance rapidly, as these afford a means of quick returns so necessary to the small farmer, who is able to give them the attention they require. Wherever such developments have taken place this is found to be the result. Farmers, however, could do much more than they have yet attempted, except in a few isolated cases, but which fully justify this statement. Even the larger farmers may share in progressive poultry culture, specially where they are willing to adopt the colony house system, as described in the writer's report on the poultry industry in America, recently published by the National Poultry Organisation Society, and which would appear to be eminently suitable to many sections of our own country where poultry are a negligible quantity. Such a method applied in part to poultry farms should enable them to succeed on a much larger scale than heretofore, provided there is enough land available, and would avoid both the heavy cost and dangers of permanent buildings and enclosed runs, though the latter may be employed for breeding stock during a portion of the year. We hope for the advent of men with sufficient capital, with business training, who will take up the pursuit on truly commercial lines. All this, however, shows that poultry-breeding is becoming more and more men's work, seriously undertaken, and prepared by systematic and thorough training. Women are better qualified than men for some branches of poultry-keeping, and in these they will be wanted to a greater extent than ever, but we need men for the wider operations and heavier labours involved. Of such the supply is very limited indeed as yet.

One of the most striking facts to be recorded is the steady demand for better qualities of poultry in centres where heretofore the chickens sold were of a very moderate order. This is due to the fact that consumers are beginning to realise that a well-fed bird is cheaper than a lean specimen at a lower price. In this direction Irish chickens have steadily advanced, but fattening is extending in Britain with manifest advantage both to producers and consumers. One of the best-equipped modern plants is on the farm of Mr. Lionel Phillips, at Rotherwick, Hants, where every accessory in the shape of good buildings, electric light, cold storage, etc., is to be found. During the year a very fine fattening station, owned by Mr. James Rudding, has been opened in the neighbourhood of Liverpool, where the work is carried out on a most complete scale. On the latter plant upwards of 4,000 birds can be caged at one time. The difficulty is to obtain a sufficient supply of suitable birds, and it is here where commensurate enterprise on the part of producers is needed. That story, however, is a very old one. The south-eastern fatteners have made the same complaint for years. They still retain their supremacy in this branch, but the pursuit would have grown to a much larger extent had the supply of lean chickens advanced in accordance with the demand. To a large extent all fatteners have to depend upon Irish birds. That trade, however, has its limitations. Farmers and others in suitable districts should lay themselves out to breed chickens early enough and good enough for this purpose. Experiments have shown that these can be raised to the age of twelve weeks at a cost, exclusive of interest on capital and labour, of 9d. each, which leaves a margin of profit if marketed at the right season of the year.

Although not of immediate value practically, mention may be made of a series of observations carried out by the Ceylon Poultry Club, in regard to the affinity of the wild fowl of that island with our domestic birds. Hitherto it has been thought that the progenitor of the ordinary hen was the Jungle Fowl of India (*Gallus ferrugineus*), but experiments have shown that the Jungle Fowl of Ceylon (*Gallus stanleyii*) will interbreed with domestic specimens. Thus the entire question may have to be reconsidered. Before we can come to any definite conclusion further experiments are desirable.

An increasing amount of attention to experimental work in relation to poultry culture has marked the last year, as recorded in reports published by various agricultural colleges, where this subject receives attention. But research work is infinitesimal compared with what is needed. During my tour in America I was deeply impressed with the amount of attention given to investigation. Both in Canada and the United States well-equipped stations are devoted to experimental work alone, as at Ottawa and Geneva, and in connection with the various colleges a large amount of research is carried out. At one institution visited no fewer than fifteen distinct experiments have been conducted during 1906, some of which must extend over three or four years to be of real value. It is entirely a question of money. However much our college authorities desire to extend this valuable branch, they are unable to do so. The Rhode Island Agricultural Station has hitherto received £3,000 per annum from the Federal Government for experimental work, which sum is now to be increased to £6,000. The total grants made by the Board of Agriculture for research work in 1904-5 amounted to £650. In the smaller State of Connecticut this year £200 was allotted to poultry experiments alone, or nearly one-third as much as granted to agriculture in the whole of Great Britain. A thousand pounds per annum for the next five years would be none too much for poultry research, and could be well expended, proving one of the best possible investments. It may be hoped that the scheme recently suggested by the Board of Agriculture, with adequate financial support, may be carried out.

For reasons already stated, the adoption of combined methods of marketing may chiefly be looked for in agricultural districts more remote from industrial, commercial, and residential centres, where prices are comparatively low, and the margin between these and such as are obtainable elsewhere offers an opportunity of securing more adequate returns. It cannot be claimed that the progress made has been at all rapid, due to a strong indisposition to change present methods, to the pressure of vested interests, and to the want of local initiative. Until there is someone to lead, to undertake the preliminary work, to act as pioneer, it is difficult to move those to whom the question is supremely important. Where such can be found, the results in the great majority of cases have been abundantly satisfactory, by enhancement of returns due to more expeditious marketing and better prices thus secured. Those districts which would reap the greatest advantages by co-operative poultry and egg societies are most difficult to move. That is always the case. But it is undoubtedly true that there has been a great improvement in home produce during the last few years, apart from the countries where depôts of the N.P.O.S. are in operation, and which can be attributed to the publicity and stimulus given to this question, to the advocacy of better methods, and to the fear in some cases of competition. This indirect result is very great indeed, and, although it cannot be tabulated, has had a wide-reaching influence. There can be no doubt that it has led to a great increase of the poultry industry. But there are many sections of the country where practically nothing has been done, and where the need for combination is most manifest. To some extent spring prices have been improved by relieving the markets of surplus eggs by preservation, which goods are finding an increasing demand where the method is well carried out.

A most important Act of Parliament came into force on January 1, 1907, to which the attention of all concerned may be here drawn, and is entitled Fertilisers and Feeding Stuffs Act, 1906 (6 Edw. VII., ch. 27). It provides that poultry foods shall be subject to the same conditions as food for other stock. Artificially prepared foods, when sold, shall have stated on the invoice "the name of the article, and whether it has been prepared from more than one substance or seed," and "what are the respective percentages (if any) of oil and albuminoids contained in the article." In the case of mixed seeds or meals the ingredients must be stated, and heavy penalties are imposed for contravention of the Act. Vendors and purchasers of poultry foods must meet the altered conditions thus entailed.

The Trade and Navigation Returns for 1906 again show an advance in the imports of eggs, which have now reached upwards of £7,000,000 sterling in value, and a further decline in the imports of poultry. The figures are as follows for three years:—

	1904. £	1905. £	1906. £
Eggs	6,730,574 ...	6,812,436 ...	7,098,137
Poultry	1,089,145 ...	905,791 ...	869,117
Totals	£7,819,719	£7,718,227	£7,967,254

From this it will be seen that the increase in eggs in 1906, as compared with 1905, was £285,701, and the decrease in poultry was £36,674, or a net increase of £249,027. What these figures suggest is stated below.

In connection with eggs, the returns repay careful study, for the excellent prices maintained throughout the year is seen, not only with regard to home supplies, but those from abroad. The imports recorded amount to 18,874,109 great hundreds, or 2,264,893,080—an increase over 1905 of 59,848 great hundreds, or 7,181,760—remarkably small when the increase of values named above is considered. Decreases of supplies are reported from Russia, Denmark, France, Canada, and other countries, and increases from Germany and Belgium; but it is of interest to note that the value of the eggs from Denmark was greater in 1906 by £67,003, although the quantity was less by 34,193 great hundreds. Below are the figures for the respective countries:—

	Quantities Gt. Hds.	Values. £	Per Cent.
Russia	7,132,928 ...	2,344,256 ...	37·79
Denmark	3,823,942 ...	1,701,291 ...	20·25
Germany	2,644,242 ...	957,905 ...	14·01
Belgium	2.444,746 ...	992,103 ...	12·95
France	1,491,269 ...	623,119 ...	7·9
Canada	231,719 ...	106,393 ...	1·22
Other countries ...	1,105,263 ...	373,070 ...	5·9
	18,874,109	£7,098,137	100·00

These figures do not represent the true facts of the case for reasons stated in previous years—namely, that the country credited is the last through which the produce passes. Denmark, France, Canada, and other countries send their supplies direct. Of the supplies placed to the credit of Germany, two-thirds are Russian and one-third Austro-Hungarian, and of the Belgian two-thirds came from Italy and one-third from Austria-Hungary. On that basis the values and percentages of imports would be as under:—

TOTAL IMPORTS.

	Values. £		Percentage.
Russia	2,982,859	..	47·13
Denmark	1,701,291	..	20·25
Austria-Hungary ...	650,008	..	8·98
Italy	661,402	..	8·62
France	623,119	..	7·9
Canada	106,393	..	1·22
Other countries ...	373,070	..	5·9
	£7,098,187		100·00

Since 1898, when there was a sharp fall in price of foreign eggs, the average values have steadily risen, and in 1906 were higher than during any year on record. In 1898 the declared values were 5s. 10d. per great hundred, doubtless due to the large increase of Russian supplies, which are of a low grade. The averages for the last four years are:—

1903	6s. 8d. per gt. hd.
1904	6s. 9d. ,,
1905	7s. 2¾d. ,,
1906	7s. 6¼d. ,,

We have here further evidence of an increasing demand on the one hand, with improved methods of marketing on the other. The figures relating to the respective countries are very suggestive:—

	1904. Per gt. hd. s.	d.	1905. Per gt. hd. s.	d.	1906. Per gt. hd. s.	d.
Russia	5	9¾	6	4¼	6	6¾
Denmark .	8	1¼	8	5½	8	10¾
Germany . ..	6	8½	7	0¼	7	3
Belgium	6	7¾	7	8½	8	1¼
France	8	4¼	8	5¼	8	4¼
Canada	8	2¼	8	9½	9	2¼
Other countries ...	5	10½	6	5¾	6	9

It is thus seen that the only country named in which there is any reduction in price is France. Canadian supplies show a large advance, but the quantities are small, and come to us practically only in winter. The steady progress of Danish eggs is remarkable. In 1899 the average declared values were 6s. 0¾d. per great hundred, whereas last year they had increased to 8s. 1¼d., an advance of 25 per cent.—a tribute to the splendid system of marketing adopted in that country. The same is true to a lesser extent as regards Italian and Austro-Hungarian produce, though comparisons cannot be made.

As already explained, the fall of imports of poultry is considerable. We can give values only. It would be a great advantage if the weights were stated. Below are the returns in respect to countries:—

	£
Russia	185,635
Belgium	194,978
France	203,714
United States of America	243,750
Other countries	41,040
	£869,117

The supplies credited to Belgium are practically the same as in 1905, but Russia, France, and other countries show a large decrease, that of the first of these three countries amounting to £90,000. The only increase is from the United States, equal to nearly £92,000. My observations in the producing and packing centres of the States last summer led me to the conclusion that there is every prospect of this trade growing to an even greater extent, to the displacement of Continental supplies. As, however, it must always remain a cold storage trade, home producers need not fear if they pay careful attention to rearing and fattening.

THE YOUNG STOCK SHOW.

The shows of poultry or, more strictly speaking, shows at which poultry are exhibited are with us almost continually in this State. The poultry show season proper is a busy time for fanciers during the winter months, viz., June and July, then after them come the poultry section at the general Agricultural fixtures all over the State during September, October, and November, after them come the fruit shows at which poultry are also exhibited; these are over and we now come to the first fanciers event of the coming season, viz., the young stock show which was initiated by Mr. W. C. Byass some two years ago and is still being carried on under his direction. This show always creates a great deal of interest, it is entirely confined to young birds which have been bred during the past season. The show is announced to be held at the Perth Town Hall on Friday and Saturday, 19th and 20th April.

THE NARROGIN FARM.

There are a large number of birds for sale, chiefly cockerels of the following breeds, viz., White and Brown Leghorn, Silver Wyandottes, and Plymouth Rocks; there are also a nice lot of Pekin and Indian Runner Ducks and Drakes for sale. The stock are all in good condition and laying well. The termination of the competition will give 25 splendid pens which will be of great service for breeding pens, and all going well, the following season should result in the production of a much larger number of young stock; it is also intended to keep more breeds, those to be added for certain are Black and Buff Orpingtons and Minorcas.

A splendid opportunity is here afforded students to get a good insight into poultry management which is eagerly availed of; they come on in batches of three or four and work for a month, but students who wish to make a complete study of the subject are at liberty to stay longer. The working hours are from 6a.m. to 6 p.m., but as they are too long for students, our special student works from 6 a.m. to 8 a.m., 11 a.m. to 1 p.m., and 4 p.m. to 6 p.m.

A fair number of visitors call to inspect the Poultry Department from all parts of the State, and with the opening of the Collie Railway an easy means of access will be thus afforded the residents of the South-West districts. Among recent visitors was the Honourable the Minister for Agriculture, Mr. James Mitchell, an old-time fancier, who expressed the opinion that the poultry were the largest and finest lot of healthy fowls he had seen in the State.

COLD STORAGE NOTES.

CHILLED BEEF.

By A. D. Cairns.

Ever since the earlier shipments of American fresh beef were transported across the comparatively cold latitude of the North Atlantic by the Anchor Line in the earlier eighties, the success that followed this new venture has always been a strong incentive to extend the method to the whole of the furthest beef-producing countries of the Globe. With a fairly short summer and a cheap supply of natural ice, the progressive Glasgow butcher gave the oversea transport of meat its first real trial. Chilled meat was hung in the tween decks fairly close together, one quarter high up, the other touching the floor within a foot, halfway across the deck; the other half of the deck being stowed full of ice, and the whole encased in an insulated chamber which carried the meat in a tip-top condition a ten or fourteen days' run, according to the weather. Since that date the frozen meat business has grown beyond all the dreams of the earliest enthusiasts and investors, and will not be confused with the more delicate and valuable commodity under observation, that is, its chilled rival. North American chilled beef realised from 4¾d. to 6¾d. in Smithfield in 1906. The other competitor, River Plate, never exceeded 5d., but the latter's quantity of quarters sent was close on half a million, and they were all hinds. New Zealand sent two small shipments, and is persevering to keep this trade up, but the time between ports, either for Australia or New Zealand, is a heavy handicap. The above figures are practically 30 per cent. to 50 per cent. over the ruling rates for frozen meat at most periods of the year; and on the face of the fact that the London underwriters, on 20th December, 1906, in renewing their covers for River Plate meat shipments, *excepted* chilled beef, show the enterprise of the chilled meat operators to keep the trade going despite this unusually heavy set-back; it also shows the taste of the British beef eater in paying the higher figure for the better article is based on practical results of food value. It is also well to note that Australian brains are responsible for much of the success of River Plate chilled beef.

While our beef resources from Kimberley and Wyndham are not a prohibitive distance away from Perth by sea for the practical possibility of chilled meat transport being entertained, it must be quite clear to the average man that to kill beef a few degrees from the Equator many things may happen before the consumer here may get it as good or as reasonable as his British contemporary. Ships equipped for this trade will cost a great deal more to equip and maintain than for the live-stock business; machinery and fixtures must be of a very permanent nature, and carry a large margin of safety for such a delicate cargo. The exacting nature of the work may be gleaned from present practice, which shows that the variation of 2 degrees F. may mean heavy loss to the owner of the meat, and rapid deterioration of its food value. Several shipments that left Australia in splendid order had to be frozen down before its arrival in London. So many and great have been the losses in long distance carriage of chilled meat that one looks with much hope at a lately patented process whereby the air in the chamber is sterilised. The description taken from "British Ice Cold Storage" is certainly interesting to meat and cattle men.

The fact of its being tested successfully by the best men in the meat world, and that the company handling the process has been formed (capital £45,000) to control the patent, and they deal with meat in quantities from the size of a retail butcher's chamber up to the largest chamber in any cold storage warehouse. These chemical fumes are claimed to prevent flies from coming near the meat. This itself would be a great boon in Western Australia.

While we watch the progress of the chemist hand in hand with the engineer in controlling the processes of decay in the food of the nations, new ways of surmounting difficulties must have the elements of simplicity and economy in their working, as this process seems to possess, for air purification and sterilisation for all perishable commodities.

When the work of chilling, freezing, or preserving beef is taken up seriously by our northern cattle owners, it is too much to hope that money will be made at least for a season or two even with the best methods at present adopted in this work. Labour at Wyndham, cost of fuel, repairs and refits after the works are installed will require a more profitable market than London, if frozen beef were the only output of such works. It is questionable if ever the price realised for Australian frozen fores in London paid for the trouble of preparation. With hinds, however, a better price is generally looked for, and if the Continental markets would open up, there may come a time when West Australian beef may take the place of horseflesh or the less inviting dogs' meat, now eaten in considerable quantities in Germany.

The Agrarian Party in that country worked the bovine tuberculosis scare for all it was worth, and for the last few years have kept out Australian beef altogether. British authorities in the meat trade state that this condition of things cannot last much longer, as the people to whom meat is becoming a luxury will eventually overrule the opposition of this party and open the door to the frozen or chilled commodity which Australia or Argentine are prepared to supply them with.

While it is good to look far afield for outlets or probable markets, our own requirements should not be forgotten—an occasional cargo may be sold to any of the naval or military stations in the near or far East—it can never be expected that the yellow or black races of those places will have the means to purchase it in quantity, even if caste prejudice or religious principles were overcome. The meat eaters, that of our own race, are the greatest consumers always. Now that an annual surplus of beef sufficient for our own needs is available distant about ten days' steaming from Fremantle, the time may not be far distant when chilled beef, killed near its native pastures, will be conveyed to our doors, mellow, juicy, fat, and full-flavoured, with the adoption of some method of the above nature, whereby the safety of the shipment is assured by this combination of the chemist and the refrigerator.

THE FERTILISER ACT.

The Inspector of Fertilisers has had prepared a list of all the registered brands of fertilisers sold by vendors in this State, and the same is published herewith.

Section 4 of "The Fertilisers and Feeding Stuffs Act" states:—

"It shall be unlawful to sell, exhibit, or offer for sale any fertiliser unless—

"(1) The brand of such fertiliser; and

"(2) The minimum percentages of nitrogen, potash in readily soluble form, water soluble phosphoric acid, citrate soluble phosphoric acid, acid soluble phosphoric acid, and moisture contained in such fertiliser are registered in the prescribed manner at the Department of Agriculture, in Perth."

Now that the list of registered brands is available settlers should see, for their own protection, that they only purchase registered brands; and if any brands not included in the attached list are offered to them they should communicate with the Department of Agriculture, Perth, giving particulars of the case, when the necessary action will be taken.

Barrow & Co., Henderson Street, Fremantle. B. & Co. over F.

Edward Barnett & Co., Albany. IXL Fertiliser No. 1; do. No. 2; do. No. 3; do. No. 4.

Binney & Son, Welshpool. Super over Bone Dust over Swan Works, Welshpool; Binney & Son over Swan Works, Welshpool.

Couche Calder Co. Crown; Crown over The Sir John B. Lawes Co.; Crown over Kali Syndikat.

Davis & Fallowfield, Geraldton. Abrolhos Guano.

Drew, Robinson & Co., Albany. "St. George."

Dalgety & Co., Fremantle. Albatross.

J. M. Drummond & Co., 550 Hay Street, Perth. J.M.D. over F.; Kainit over L.C.; D. over F.; W. & Co.

Elder, Shenton & Co., Fremantle. ELDER.

Farmers' Direct Supply Co. P over F.

Forrest, Emanuel & Co , Perth, B.G.; BBG.; Forrest, Emanuel & Co's B. & B. Manure; do. Blood Manure; do. Bone Manure.

Robt. Forrest & Co., Bunbury. Eclipse.

Gardner. Bros., 385 Murray Street, Perth. Cockbill; M.L. in diamond between Regd. and Brand; G.B.

Guthrie & Co., Fremantle. Waddell's Special Fertiliser; Guthrie & Co. over Elephant in circle.

Harris, Scarfe & Co., Murray Street, Perth. G. P. over H. S. in cross. H. P. G. over 2978 over c in diamond over Fremantle.

W. R. Haynes & Co., Murray Street, Perth. C. over W.S. in triangle over 3; Haynes over B.B.

Thos. Hayward & Sons, Bunbury. H. & S. over Kainit; H. & S. over Muriate of Potash; H. & S. over Sulphate of Potash; H. & S. over Potato Manure; H. & S. over Sulphate of Ammonia; H. & S. over Nitro Superphosphate; H. & S. over Bonedust & Super; "Magic."

Ockerby & Co., 49 Cliff Street, Fremantle. The Bee Fertiliser Registered between B B over bee; "The Prolific Fertiliser."

Paterson & Co., Ltd., Fremantle P. over B.M. in heart over Fremantle.

Wm. Padbury, Guildford. Peerless.

H. A. Stephenson, 284 Wellington Street. B.B. over A.

Waterhouse, J., 551 Wellington Street, Perth. W. in diamond.

H. J. Wigmore, Cliff Street, Fremantle. W in oblong between B B.

Wilshire & Feely, Fremantle. "B. & B."; W. & F. over B. B.

Geo. Wills & Co., Fremantle. Globe.

Western Australian Producers' Co-operative Union, Ltd. Producers in oblong; FISONS Potato Fertiliser; Producers No. x; FISONS Concentrated; Producers' Special.

The Inspector of Fertilisers, Mr. P. Wicken, reports having received from the Government Analyst a further list of the analyses of fertilisers taken in connection with "The Fertilisers and Feeding Stuffs Act." This list is supplementary to the list published in the November issue of the *Journal*, and the explanatory notes of the unit values given therein are the same for the attached list.

The unit values are as follow:—

Ingredient.	Form.	Value per unit. s.	d.
Nitrogen . . .	In the form of Nitrates (Nitrate of Soda)	17	9
Do.	Do. Sulphates (Sulphate of Ammonia) ...	17	6
Do.	Do.. Organic Matter (Blood and Bones)...	15	3
Potash	As Sulphate	5	10
Do.	As Muriate	4	6
Phosphoric Acid ..	Water Soluble	5	2
Do. do. ...	Citrate Soluble	3	6
Do. do. ...	Acid Soluble	3	3
Do. do. ...	In Thomas Phosphate, without regard to solubility	3	5

THE ANALYSIS OF FERTILISERS.

	Number of Sample.	Name of Fertiliser.	Where obtained.	Nitrogen.	Water Soluble Phosphoric Acid.	Citrate Soluble Phosphoric Acid.	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.	Value on Unit Basis.		
										£	s.	d.
Guaranteed analysis	65	Superphosphate bonedust ...	Guthrie & Co., Fremantle	3·5	...	...	...	18·3	...	5	12	10
Found by Government Analyst ...	65	Do. do. .	do.	3·94	...	5·34	14·63	19·97	...	6	6	2
Guaranteed analysis	66	Abrolhos guano	do.	·92	..	21·31	8·40	29·71	...	5	15	11
Found by Government Analyst ...	66	Do.	do.	1·06	...	4·57	22·38	26·95	...	a5	4	8
Guaranteed analysis	48	Waddell's Special Fertiliser ..	do.	2·23	..	4·82	10·0	14·82	...	4	8	5
Found by Government Analyst ...	48	Do.	do.	2·41	...	2·21	11·17	13·38	...	4	6	2
Guaranteed analysis	76	Fison's potato manure ...	Producers' Union, Welshpool ...	1·73	6·81	·45	1·83	9·11	...	3	12	10
Found by Government Analyst ...	76	Do.	do.	2·53	8·64	2·17	1·61	12·42	...	5	1	7
Guaranteed analysis	79	Producers' No. X. bone manure	do.	2·45	...	2·87	13·18	16·05	...	4	11	5
Found by Government Analyst ...	79	Do. do.	do.	2·21	...	1·31	14·45	15·76	...	4	5	3
Guaranteed analysis	78	Sulphate of potash	do.	...	...	...	...	...	52·0	15	3	4
Found by Government Analyst ...	78	Do.	do.	...	...	...	...	...	51·76	15	1	10
Guaranteed analysis...	77	Nitrate of Soda	do	15·0	...	...	...	...	...	13	6	3
Found by Government Analyst ...	77	Do.	do.	15·0	...	...	...	...	...	13	6	3
Guaranteed analysis	80	Fertiliser, blood and bone ...	J. Waterhouse, Wellington St., Perth	5·0	...	.	...	12·00	...	5	15	3
Found by Government Analyst ...	80	Do.	do. ...	4·97	...	5·44	8·58	14·02	...	6	2	4
Guaranteed analysis	81	Fertilizer, Haynes' B.B. ..	Haynes & Co., Murray Street, Perth	4·5	...	...	...	12·0	...	5	7	7
Found by Government Analyst ...	81	Do.	do. do. ...	4·70	...	6·81	7·78	14·59	...	6	0	7
Guaranteed analysis	82	Shirley fertiliser, No. 5 ..	R. Forrest, Bunbury	3·42	11·77		...	11·77	6·43	7	18	0
Found by Government Analyst ...	82	Do.	do.	3·58	14·75	·80	...	15·55	6·08	8	17	0
Guaranteed analysis	89	Sulphate of ammonia	do.	20·0	...	. .	...	...	...	17	10	0
Found by Government Analyst ...	89	Do.	do.	20·21	...	...	..	...	...	17	13	7
Guaranteed analysis	83	Eclipse super.	do.	. .	17·11	1·94	...	19·05	...	4	15	1
Found by Government Analyst ...	83	Do.	do.	...	15·57	2·32	...	17·89	...	4	8	6
Guaranteed analysis	99	Thomas' phosphate	do.	...	...	14·0	...	14·0	...	2	7	10
Found by Government Analyst ...	99	Do.	do.	...	...	...	...	14·41	...	2	9	2

a Below registration in Nitrogen.

THE ANALYSIS OF FERTILISERS—*continued.*

	Number of Sample	Name of Fertiliser	Where obtained	Nitrogen	Water Soluble Phosphoric Acid	Citrate Soluble Phosphoric Acid	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.	Value on Unit Basis. £	s	d.
Guaranteed analysis	72	Bonedust	J M Drummond & Co , Perth	2 60			15 0	15 0		4	8	4
Found by Government Analyst	72	Do	do do	3 47		6 75	9 63	16 38		a5	7	9
Guaranteed analysis	75	Sulphate of potash	George Wills & Co , Fremantle						48·00	14	0	0
Found by Government Analyst	75	Do	do do						49·85	14	10	9
Guaranteed analysis	67	B B G manure	Forrest, Emanuel & Co do	2 38		4·72	11·7	16 42		4	10	9
Found by Government Analyst	67	Do	do do	2 86		2 51	10 14	12·65		b4	5	3
Guaranteed analysis	68	B G manure	Forrest, Emanuel, & Co , Fremantle			4·3	10 31	14 61		4	12	11
Found by Government Analyst	68	Do	do do			2 56	9·61	12 17		c3	13	9
Guaranteed analysis	69	Blood manure	do do	1·58		2 08	3 86	5 94		2	3	9
Found by Government Analyst	69	Do	do do	2 63		1 30	3 30	4 6		2	15	4
Guaranteed analysis	70	Blood and bone	Barrow & Co , Fremantle	1 89			19 60	19 60		4	12	6
Found by Government Analyst	70	Do	do do	2 21		5 07	13 71	18 78		4	15	10
Guaranteed analysis	71	Nitro bone manure	do do	2 60			15 0	15 0		4	8	4
Found by Government Analyst	71	Do	do do	2 41		4 92	11 92	16·82		4	12	6
Guaranteed analysis	35	Nitrate of soda	Couch Calder, & Co Welshpool	15 0						13	6	3
Found by Government Analyst	35	Do	do do	15 34						13	12	3
Guaranteed analysis	53	Do	W Padbury & Co , Guildford	15 0						13	6	3
Found by Government Analyst	53	Do	do do	15 92						14	2	6
Guaranteed analysis	90	Blood manure	R Forrest, Bunbury	12 0		2 08	3 86	5.94		10	2	9
Found by Government Analyst	90	Do	do do	12 22		1 41	16	1 57		c8	1	3
Guaranteed analysis	87	Sulphate of potash	do do						52·2	15	4	6
Found by Government Analyst	87	Do	do do						d 48 79	d14	4	8
Guaranteed analysis	88	Kainit	do do						12 00	3	10	0
Found by Government Analyst	88	Do	do do.						d 11·78	3	8	9

Guaranteed analysis	86	Shirley No 2	do			15 57	44		16 01		4	1	10
Found by Government Analyst	86	Do	do			15 26	·68		15 94		4	1	2
Guaranteed analysis	84	Eclipse superior bonedust	do		3 75			18 3	18 3		5	16	6
Found by Government Analyst	84	Do	do		3 61		7 17	17 43	24 60		6	16	8
Guaranteed analysis	85	Nitrate of soda	do		15 0						13	6	3
Found by Government Analyst	85	Do	do		15 64						13	17	6
Government analysis	92	Potato manure	Hayward & Sons, Bunbury		63	9 0	3 49	4 93	17 42	5 0	5	14	10
Found by Government Analyst	92	Do	do		1 34	7 53	5 53	6 35	19 41	1 35	e 5	10	0
Guaranteed analysis	91	Nitro superphosphate	do		1 0	10 0	3 88	5 48	19 36		5	0	5
Found by Government Analyst	91	Do	do		1 04	11 93	3 0	5 82	20 75		5	9	1
Guaranteed analysis	95	Sulphate of potash	do							52 38	15	5	6
Found by Government Analyst	95	Do	do							51·97	15	3	1
Guaranteed analysis	96	Bonedust and superphosphate	do		1 5	7 50	5 0	8 5	21 0		5	6	9
Found by Government Analyst	96	Do do	do		1 93	6 60	8 71	6 32	21 63		5	13	9
Guaranteed analysis	93	Muriate of potash	do							62 0	13	19	0
Found by Government Analyst	93	Do	do							56 36	d 12	13	7
Guaranteed analysis	94	Kainit	do							12·92	3	15	4
Found by Government Analyst	94	Do	do							11 8	d 3	8	10
Guaranteed analysis	50	Florida superphosphate	Gardner Bros , Fremantle			17 0	1 0	2 0	20 0		4	17	10
Found by Government Analyst	50	Do	do			18 59	52	3 05	22 16		5	8	0
Guaranteed analysis	59	Bonedust	do		3 75				18 3		5	16	9
Found by Government Analyst	59	Do	do		3 80		4 13	18 12	22 25		6	13	4
Guaranteed analysis	98	Nitro superphosphate	do	Perth	1 67	16 0	1 0	0 75	17 75		5	17	9
Found by Government Analyst	98	Do	do	do	2 35	16 47	0 10	1 07	17 64		6	10	11
Guaranteed analysis	97	Mt Lyell superphosphate	do	do		18 5	1 25	1 0	20 75		5	3	1
Found by Government Analyst	97	Do	do	do		19 04		1 48	20 52		5	3	2
Guaranteed analysis	60	Bonedust	G Gill Guildford		3 75				18 3		5	16	9
Found by Government Analyst	60	Do	do	do	4 90		4 99	15 40	20 39		7	2	1
Guaranteed analysis	74	Sulphate of potash	J M Drummond & Co	Perth						51 16	13	8	4
Found by Government Analyst	74	Do	do	do						51 07	13	7	9
Guaranteed analysis	73	Muriate of potash	do	do						60 0	13	10	0
Found by Government Analyst	73	Do	do	do						61 51	13	16	9

a Below registration in Nitrogen b Below registration in Phosphoric Acid c Below registration in Nitrogen and Phosphoric Acid
d Below registration in Potash e Below registration in Potash and Phosphoric Acid

CHAPMAN EXPERIMENTAL FARM.

By J. KEAYS.

The following returns are from the manurial test plots, and variety wheat tests. The experimental fertiliser (No. 2), mentioned in the manurial test, was forwarded by the Farmers' Co-operative Union for trial.

The following are results of manurial test plots, one acre each, sown June 28th, half of area sandy loam, balance sand-plain. Toby's Luck wheat sown at the rate of one bushel per acre :—

Plot No.	Fertiliser.	Quantity.	Top dressed	Yield, bushels.	Remarks.
1	Superphosphate ...	1 cwt.		$17\frac{43}{60}$	Medium height, strong straw, good grain.
2	Exper. Fertiliser	,,		$18\frac{40}{60}$	Medium height, strong straw, good grain.
3	Superphosphate	80 lbs	28lbs. Sulph Ammonia	$19\frac{5}{60}$	Tall straw, well headed, good grain.
4	Do.	,,	28lbs Sulph. Potash	$17\frac{32}{60}$	Tall straw, fair heads, good grain
5	Do	,,	28lbs. Nitrate Soda	$19\frac{18}{60}$	Tall straw, good heads, good grain.
6	Thomas' Phosphate	1 cwt.		$15\frac{1}{60}$	Medium height, fair heads, good grain.
7	Do.	80 lbs.	28lbs. Sulph. Ammonia	$16\frac{1}{60}$	Tall straw, fair heads, good grain
8	Do.	,,	28lbs Sulph. Potash	$17\frac{14}{60}$	Tall straw, fair heads, good grain
9	Do.	,,	28lbs. Nitrate Soda	$17\frac{24}{60}$	Tall straw, fair heads, good grain
10	Super. and Guano, equal parts	1½ cwts.		$20\frac{39}{60}$	Tall straw, stooled well, good heads, good grain.
11	Thomas' Phos and Guano, equal parts	1½ cwts.		$20\frac{44}{60}$	Tall straw, stooled well, good heads, good grain.
12	Gypsum ...	2 cwts.		$7\frac{21}{60}$	Very poor, thin and short, small grain.
13	Gypsum, 1 cwt. Sulph. Ammonia ½ cwt	1½ cwts.		$10\frac{13}{60}$	Poor, thin, short, small heads.
14	Bone dust	1 cwt.	.	$13\frac{12}{60}$	Medium height, thin, short.
15	Kainit	1 cwt		$6\frac{53}{60}$	Very poor, thin, short.

VARIETY WHEAT TESTS.

Sown on 25th June on virgin soil, half the area of each plot sandy loam, balance sand-plain fertilised with superphosphate 1 cwt. per acre; 60 lbs. of seed per acre; area of plots, 1 acre each :—

Plot No.	Variety.	Yield in bushels.	Remarks.
1	Toby's Luck	$17\frac{10}{60}$	Good grain, strong straw, medium height, very early, sheds slightly.
2	Jade	$17\frac{42}{60}$	Midseason to early, tall straw, plump grain, holds grain well
3	Sullivan's Early	15	Early, tall straw, sheds freely.
4	Alpha	$16\frac{7}{60}$	do. weak straw, good grain, sheds slightly.
5	Australian XB 100	$16\frac{27}{60}$	do. tall straw, fair grain, sheds freely.
6	Do. 73	$13\frac{28}{60}$	do. medium straw, thin heads, sheds freely.
7	Do. 77 ..	14	do. do. do. do.
8	White Lammas	$10\frac{30}{60}$	Midseason, short straw, plump grain, holds grain well.
9	Marshalls No. 3	$12\frac{15}{60}$	do. medium straw, grain fair sample.
10	Plover	$13\frac{44}{60}$	do. short straw, good grain, holds grain well.
11	Federation	12	do. medium straw, seed somewhat mixed, not true to type.
12	Golden Drop	$11\frac{8}{60}$	Late to midseason, short straw, small heads, shotty grain.
13	Tardent's Blue	$12\frac{45}{60}$	Late, short straw, good grain.
14	Stemler	$12\frac{35}{60}$	Midseason, thin straw, fair grain.

NARROGIN STATE FARM.

REPORT FOR THE MONTH OF FEBRUARY.

By R. C. Baird.

All harvesting operations were completed early in the month. The work was rendered unnecessarily slow through having to use an obsolete type of thresher. The bulk of the wheat crop was taken off with the stripper, but the oat crop was threshed, in order to save the straw.

The results of the field crops, together with those of the experimental plots, will be forwarded with next month's report.

The orchard and vineyard are looking healthy, the young trees having made good growth. A fair crop of peaches was obtained from several of the trees. The vines have borne a heavy crop, but the grapes have ripened very slowly. Water melons produced an abundant crop, and proved very useful at a time when other fruit was unobtainable.

The tomato crop is a fairly heavy one, some remarkably fine fruit being produced, which has been a good substitute for green vegetables. Pumpkins have produced a good crop. These have been taken up and stored for future use.

The Ironbark variety are still growing, and will give a good crop.

At one period during the summer fears were entertained that there would be a shortage of water, both for household and stock purposes. We have, however, opened up several soaks, two of which have proved to have a very good supply of fresh water, and I think we will now manage through the remainder of the summer without inconvenience.

The natural pastures are now very dry, and feed is getting scarce. The stock are, however, in very fair condition, and will, I think, hold their own till the rains set in.

ERADICATION OF NOXIOUS WEEDS.

Amongst the people on the land there have been some allegations of departmental indifference to the very important work of dealing with the numerous noxious weeds that infest our agricultural and pastoral areas. It has been noticed that the usual Parliamentary vote for weed eradication is absent from the Estimates for the coming year, and the impression has been created that the Department was entirely abandoning all action in this matter. For the purpose of getting a statement of the laws bearing upon noxious weeds, and the present policy of the Department in regard thereto, a representative of the "West Australian" recently interviewed the Under Secretary for Agriculture (Mr. A. Despeissis).

Mr. Despeissis kindly began by detailing the circumstances leading up to the present noxious weeds law.

" The only weeds that were recognised in Western Australia some years ago " he said " were those dealt with in the Spanish Radish and Scotch Thistle Act. Both these weeds, however, have been found not so bad as they were painted, and the latter has ceased to occupy a place in the list of weeds now tabooed under the present Noxious Weeds Act. Under this law it does not suffice that a weed should be thought troublesome, injurious, or threatening, to come within the scope of the Act. Roads Boards have to report that it is desirable to have a certain plant declared a noxious weed. That report is submitted to the Agricultural Advisory Board, and on the recommendation of that body the Minister can urge the Governor to have the plant gazetted as noxious. The Act has been for a long time administered spasmodically, and without any continuity of policy. For the last two years sums of money varying from over £300 to £400 a year have been spent in the eradication mostly of one of the weeds concerned. No great amount of good seems, however, to have followed the efforts made for the suppression of the plant, which is at present thriving as vigorously as ever. I am speaking of stinkwort, which is one of those weeds declared noxious and coming within the scope of the Act, the others being Bathurst burr and its near relative, the Noogooro burr, Spanish radish, prickly pear, and the nut grass of the Eastern States. It is thus seen that the Scotch thistle has been exempted. That other weeds should be regarded as noxious is a matter that does not concern the administration of the Act. The star thistle, for instance, is a weed that is getting troublesome in some of the wheat-growing districts. Then again, as fresh districts are opened for settlement weeds which had not thrived in some of the regions previously selected will become a pest, the wild blackberry bush amongst them. Still, that is a matter for future consideration, and these plants, as well as others that may be considered injurious, can at any time be added to the list already given."

The stinkwort is, of course, the worst ?

" Yes. A great hue and cry is every year raised against this pest, and properly so. Introduced some ten years ago from South Australia, it has got a strong hold on some distrists, such as the Swan, and is gradually spreading and invading other districts. It is admitted that the compulsory eradication of that weed in those places where it has got a good hold would be productive of little permanent good, and it is a matter which should to a great extent rest with the settlers themselves to deal with. On the other hand, in other districts where the plant is in evidence, but not yet very troublesome it is quite possible to yet check its progress, if not eradicate it altogether, by cutting it up or burning it off before the blossoming season. As yet we do not know the real significance of the weed. This department is in communication with the South Australian Department of Agriculture with a view to obtaining a correct idea of the opinion entertained there as regards stinkwort. Conflicting reports have been made from time to time by private individuals, some asserting that, like thistles, stinkwort disappears from a field after a few years. When more precise information on the point is obtained it will be made available."

In the meantime, what are you doing?

"Well, the fact that no provision has yet been made for this year for the administration of the Noxious Weeds Act has thrown the work it entails entirely on the hands of the stock and orchard inspectors of the department. These officers have been instructed to issue notices enforcing the eradication of noxious weeds, and to see that their instructions are carried out, and all this is in addition to the work they already have to perform. It is thought to also enlist the services of the inspectors in the Lands Department, who cover more ground than do those of the Agricultural Department, are more numerous, travel through the country districts, and keep in touch with the settlers. So far the following inspectors have been gazetted under the Noxious Weeds Act:—J. Mills, J. Gibbons, and H. Randford (Stock Department), and T. Hooper, A. E. Lankester, J. S. Jefferson, D. L. Breen, G. Whittington, G. W. Wickens, E. C. D. Keall, and E. H. Bailey (inspectors under the Insects Pests Act). Of these half-a-dozen at the most are available for the work, which thus cannot be so comprehensive as it should be. The object, however, of having these officers appointed is to make better use of the inspectors in the Agricultural Department, and there is no reason why if they are better horsed than at the present time and given greater facilities for moving rapidly from place to place, they should not be able to do more work in connection with the administration of not only the particular Act which is their special concern, but all the Acts which come within the province of the Department of Agriculture. Should any roads board take closely to heart the administration of the Act, and wish local representatives to have power to enter land and issue certificates as provided in the Act, they have but to send the names of such persons to the department, and they will be gazetted as honorary inspectors. It must be understood, however, that as no provision has been made for dealing with the question, the matter of remuneration cannot be considered. This will enable those settlers who have large interests at stake in certain localities to protect themselves in some measure against the indifference of neighbours who may not regard the intrusion of noxious weeds as a sufficiently serious menace to trouble about. The inspectors named above will take immediate action, and issue notices as the occasion demands if roads boards or any private individual will report to them the existence of weeds in any particular locality. With more comprehensive organisation and means to fight the noxious weeds, it is hoped to suppress some of the existing ones altogether, and to guard against the encroachment of other weeds if they assert themselves at any time. In the circumstances every settler is asked to co-operate in dealing with the pests. and to lend to our inspectors every assistance in their power."

SEARCH FOR PARASITES.

"Mr. George Compere, the State Entomologist, returned from California on Monday, the 11th inst," says the *West Australian*. "Mr. Compere's personality is as interesting as his position in the entomological scheme of things—and he is probably the only man on earth who spends his days encircling the world in search of flies that, when found, are discernible only by the aid of a microscope. It is coming to be universally understood that these, the tiniest of Nature's delicate organisms, successfully hold in check other larger flies that scourge the modern orchardist as the locusts did the Egyptians of old; and Western Australia and California, giving the lead to the rest of the fruit-growing world, have jointly retained Mr. Compere to go out into the highways and byways of the earth and bring in the required parasite.

"Mr. Compere, yesterday, briefly recounted his movements since May last, when, after an exasperating recall from China, and a sickening delay of many valuable weeks, to attend an Advisory Board inquiry, he sailed for China. 'Up there,' proceeded the entomologist, readjusting the pin in a dead fly, 'I received a lot of red and purple scale-infested trees from the Californian State Commissioner. These were small trees that had been specially grown in pots and placed in Calfornian orchards, where they would become infested with the scale for which the parasite is wanted. When I got the trees, I exposed them in a parasitised orchard in China, and reshipped them to California. Fortunately I did not send all back; some I kept, and carried about with me until I myself reached California. These I succeeded in landing in splendid condition; those I had shipped all perished on the voyage. On this one lot of trees, five species of red scale parasites were taken into California. It was the first trip on which the trees were properly cared for, and, with regard to scale parasites, the most successful I have made. The black scale parasite we have in Western Australia was introduced by this infested tree method. If properly carried out, it is at once the best and cheapest method of transporting parasites. But my experience shows that there must be sent in charge of the trees somebody with a proper knowledge of their requirements, and of the requirements of the insect life they bear.

"'From China I went to India, where I dispatched a collection of fruit fly parasites to Western Australia. Unfortunately most of them issued during the voyage. It seems likely that they were not put in the cold storage and taken care of as the steamer's butcher promised would be done—and was paid for doing. Yes, fancy entrusting the ship's butcher with the care of minute insects, to obtain which I am sent all the way to India! But there you are, the butcher was the best medium offering. An officer of the State department ought to have been sent along to convey the parasites back to Western Australia. There can be no room for doubt that the successful establishment of the parasites in the State will far more than repay all that has been spent, and will still have to be spent on the work. Anyhow, the few parasites that survived the fostering care of the butcher proved to be of little use, for there were no fruit fly maggots available for them when Mr. Newman, the laboratory officer, hatched them out. So they were released and allowed to take their chance. This unavoidable omission was due to my recall, which occasioned a delay of well nigh three months. You see the Western Australian and the Indian seasons are almost at opposite periods of the year, and the parasites were secured at the end instead of the beginning of the Indian season.

"'From India I returned to China, where I spent a deal of time in the vegetable gardens, searching for the potato-moth and its parasite. However, I could find no trace of this pest there, so I went on to Japan, taking with me the Californian trees. Still looking for the potato-moth, I remained in Japan until the weather became so cold as to render further search hopeless. I had found the larvæ of a moth, working in the Japanese potato fields, which I at first took to be our Australian form of the pest, but which, on further investigation, proved to be altogether different.

"'From Japan I went to San Francisco, where I landed my red and purple scale parasites, which were then issuing in hundreds. The State Commissioner of Horticulture immediately had all the material taken to San Diego county, in the southern districts, where they were being liberted when I left. Consignments of four varieties of these parasites will be duly forwarded to this State, where we already have the fifth established. From California I came here via Sydney.'

"How is the fruit fly in New South Wales?

"'It was very bad; you can see the maggots sporting in the windows of the Sydney fruit shops. Of two dozen peaches and a like number of nectarines that I purchased in open market, I got only three clean specimens. All the rest contained maggots. They claim to have some kind of inspection over there, but I should say it is worthless. Their only methods of coping with the pest appears to be hand-picking, and the burning of fallen fruit.'

"You have noticed that there is a movement afoot in South Australia to join with New South Wales in sending the entomologist of the latter State to California to investigate the parasitical work?

"'Yes, I have. It is amusing when one remembers the consistent attitude maintained by Mr. Froggart, the New South Wales entomologist, towards the parasite theory. He persistently ridicules the very idea. Now, I see, he wants to go to California to investigate the fruit fly question. As a matter of fact, there is no such thing as a fruit fly in California. There never has been. But, apart from that, we have Mr. Froggart inconsistently asking to be allowed to go and investigate the working of a theory that time and again he has emphatically condemned. He would now consider what he has pronounced unworthy of consideration.'

"What about the codlin moth parasite in California?

"'It is doing splendidly. If Mr. Allen, the so-called fruit expert of New South Wales, when in California recently, had gone to the State Commissioner of Horticulture, or any of his deputies in the parasite work, they could, and would within a few minutes' time, have taken him to orchards where he would have practical demonstration of the work of the codlin moth parasites. Instead of applying to the department he interviewed a Mr.

Woodworth, of the Californian University—a man who probably would not know a parasite if he saw it—who told him he knew of no place in California where the codlin moth parasite was doing any good work.'

"**What do you purpose doing with regard to the introduction of the fruit-fly parasite into this State?**

"'**Well, I must go off to India in June. Further than that, the department should send somebody along with me to bring the parasites back—somebody able to look after them on the voyage and see that they do not issue before they are required. Even now, Mr. Newman is experimenting with a view to learning how long we can hold the fruit-fly eggs back in order that they might be hatched when the next lot of parasites arrive.'**

"How do you regard the keresone remedy for fruit fly?

"'**It is a remarkable discovery, and if, as it appears, the kerosene really attracts the flies, it holds wonderful potentialities. There is room for numberless remedies against the fruit fly, for it is undoubtedly the worst pest the local orchardists have to contend against. The Brazilian beetle (*Staphlinedae*), liberated last year in an infested orchard in Perth, has apparently disappeared from that particular enclosure. However, that alone is not sufficient to show that the beetle has not succeeded in establishing itself, for it is a flying insect, and may yet be found in numbers in some adjacent orchards.'**

CO-OPERATION INVITED.

"Subsequently the Hon. the Minister for Agriculture, Mr. Jas. Mitchell, M.L.A., was asked what decision, if any, he had come to with regard to Mr. Compere's projected return to India for another shipment of fruit-fly parasites. The Minister's reply was as emphatic as it was brief. 'Mr. Compere will return to India,' said he. 'There will be no delay this time. He will reach there at the very beginning of the season. Precisely how the parasites will be conveyed back to Western Australia, or in whose charge they will come, I cannot yet say; but they will be properly cared for—everything possible will be done, even if Mr. Compere himself has to return with them. Yes,' concluded the Minister, reflectively, 'we have had enough of leaving these things to the ship's butcher; and they must be established here without loss of time.'

"Mr. Despeissis, the State horticultural expert and Under Secretary for Agriculture, subsequently explained that by direction he was communicating with the Eastern States, inviting co-operation in immediately sending Mr. Compere and an expert assistant to India for a shipment of fruit-fly parasites. 'The Eastern States may or may not respond,' added Mr. Despeissis, 'but in any case Mr. Compere will go to India, and the parasites will be properly tended on the return journey.'"

CORRESPONDENCE.

DOES CLEARING INCREASE SALT IN GROUND.

A correspondent at Northam writes that wells and soaks in the district that were at one time quite fresh have become quite brackish since the timber was cleared. If this is so, can it be remedied by replanting? The matter was referred to Mr. Mann, the Government Analyst, who replied:—"It has been pretty conclusively proved that the removal of trees affects the water supply materially. After the removal of trees, a large proportion of the rainfall runs off superficially instead of passing down into the soil by seepage. It is quite conceivable, therefore, that where the seepage is diminished, the ground waters become more saline as the solutions of salt, etc., from the ground are less dilute. . . . . . The matter is very interesting and worthy of investigation. As to the proportion of trees to plant, I should think this would need to be very extensive—practically co-extensive with the original forest. Are there any other causes operating which may have led to a largely diminished "draw" on those wells, or special circumstance, such as abnormally low rainfall, which might account for the facts described?"

VALUE OF CULTIVATION

From Roelands we are advised that the plan of repeated cultivation so continuously advocated in the *Journal* is firmly believed in. The writer states, "I was always a firm believer, from practical experience, in the virtues of thorough cultivation. I have recently had a further proof of its efficacy in causing moisture to rise from the subsoil during the hot months. I planted 400 orange and Mandarin trees on the 25th of October last. This was later than I wished for, as I had intended planting in September. However, a large majority of the trees struck and grew well till Christmas. I had ploughed the land at planting with a No. 40 Oliver, which left it very rough. I was too busy to work it down at once as should have been, and the ground dried off considerably. In the first week in January many of the trees were showing yellow tops, and curled leaves and other plain indications that they had stopped growing, and were only just living. I immediately thoroughly harrowed the land twice and rolled it down. In a week after, the yellow tops had turned to deep green and the trees were noticably more healthy, and now, four weeks from date of harrowing down, every tree has started growing afresh. Trees that had not started before but had just remained green are now throwing out healthy shoots, and all are growing at a great rate. I am more convinced than ever by this practical test that cultivation during the hot months in a district with a fairly heavy winter rainfall is of more importance and more beneficial to the land, particularly in the case of fruit trees than irrigation.

THE AGRICULTURAL BANK.

ASSISTANCE TO SMALL FARMERS.

A few days ago a representative of the *Morning Herald* approached the Minister for Agriculture, Mr. James Mitchell, with an inquiry as to the extent to which applications were coming in for money under the new Agricultural Bank Act, which came into force on the first of last month.

"Applications are coming forward satisfactorily," replied the Minister, and he added: "This Act is going to be the salvation of our small farmers, who would otherwise be crushed out by the present low prices."

How will it help them over that difficulty ?

"It will enable a man to farm economically. It is not sufficient that our lands should be utilised, but the energies of our people must be utilised as well. I have often dwelt on the necessity of getting the biggest possible return from every acre of land, and now I want to emphasise the necessity of getting the biggest possible return for every pair of hands. I wish to deal entirely with the case of the man who employs no labour—the man who personally works his own land, and who is still carrying on operations in a small way. In years gone by such a man could potter along very comfortably with 50 acres of crop. It would yield him, say, 80 tons of hay or 800 bushels of wheat, either of which would represent a living at the old prices. At to-day's prices, however, 800 bushels of wheat would be worth only about £100, and would leave practically no margin over out-of-pocket expenses—nothing for the man to live on. Fortunately, most of our farmers, who had the advantage of the high prices, have passed the days of small things, and are able to face the future confidently. The beginner is the man who wants help. The first thing he must realise is that he cannot afford to waste his own energies, and since one pair of hands can deal with 200 acres of crop, that 200 acres must be his minimum. If he has anything less than that he is not giving himself a chance."

And he will need to fallow ?

"Quite so, and consequently his minimum area of cleared land must be 400 acres. There is no doubt about it, one man can and must work this 400 acres, cropping half and fallowing half each year. It is easy to see that if he does this he will be all right Let us take wheat at London values as representing the minimum price, and one of our less favoured districts as representing the minimum yield. The Kellerberrin farmer, being a long way from the port, and having an uncertain rainfall, furnishes a good example. Let us put his crop down at 12 bushels—a very poor yield for fallow land, and representing what may be expected in a poor season. His 200 acres will yield him 2,400 bushels, and even at 2s. 6d. per bushel, that represents £300. There is his living straight away."

And in good seasons he would do better ?

" Oh, yes, I will show you that he can always do better, but what I want to make clear now is that the minimum crop—giving good farming on fallow land—will yield a man a living at the minimum price, providing he uses the whole of his energies and does not crop less than 200 acres per annum. Every increase of 1d. in price would augment his income by £10, and every increase of a bushel to the acre would give him another £25. Thus the farmer near about Northam who would get, say, 2s. 9d. per bushel—and he should be able to depend on getting that at the very worst—would receive for an eighteen-bushel crop over 200 acres £495—a substantial sum when there are no wages to pay."

That you would regard as a big crop ?

" No, I would not. In case other people may think it is, I will digress for a moment from the main subject, and refer to this question of average crop. I am sure of this, that if our Northam farmer should for any reason stop cutting hay for a single season, our wheat average would astonish the world. Right from the jump all our best crops have been cut for hay, so that what is now regarded as our wheat average is merely the wheat average of our worst lands. A two-ton hay crop—by no means an unusual occurrence—is good for 25 bushels of wheat, and there is a lot of land round here growing hay to-day that, under similar treatment, would yield thirty bushels. But let us get back to the small man, who is less favourably situated. Of course his 400 acres—200 under crop and 200 under fallow—is a starting point. Don't let there be any misunderstanding about that. It is not something he has to aim at in the distant future. It is what he must have at once to do himself justice and make ends meet. After he has got up to that stage, if he is any good at all he will steadily keep on clearing and adding to his holding until he will have just as much right to look forward to an easy competency as the man in any other class of business."

How is he to get his 400 acres cleared ?

" Well, that brings us back to the starting-point. He must use the Agricultural Bank. A lot of our new settlers have taken up fairly big areas and have very little capital. Left to themselves they would be starved out under the present conditions in regard to prices. The new Bank Act has come just in the nick of time. The man I referred to at the outset, who is struggling along with 50 acres cleared, can go to the bank to-day and get the money to clear more. Up to £300 he can obtain advances to the full value of his improvements, and after that he can obtain £200 or any portion of it on the basis of £1 for every £1 of his own that he spends. The man who has no money can come in and get enough to enable him to reach the 400 acre minimum. The money is there. The bank has an authorisation of £400,000, and we want to see all that money at work. I hope the people all over the State will avail themselves of it, but naturally I am most anxious that the people of my own district should lead the way. When the Agricultural Bank was first established the Northam people made use of it, with the result that the Northam district is to-day far the most advanced agricultural district in the State. We used the bank then to enable us to take advantage of the high prices of produce, and we can use it to-day to tide us over the difficulty occasioned by low prices. It must not be forgotten that in other parts of Australia, where the rainfall is less certain, and the land is probably inferior to most of ours, farmers are growing wheat for the London market not merely at a profit, but at a return that is steadily making them prosperous, and we can do the same. Of course, the man with the 400 acres cannot get the best out of his land and out of himself unless he goes in for a few head of stock. Here, again, the Agricultural Bank will help him to the extent of £100 for the purchase of stock, and he would find that a few dairy cattle, 100 ewes, or some pigs, with a few poultry, would make a very substantial addition to his annual income. But he must always look on the wheat as his bread and butter line, and I maintain that with 400 acres cleared a man can live on his wheat alone. You understand that all through I have been dealing with minimums, and taking the most unfavourable position. As a matter of fact, the man at Kellerberrin would do much better than I have suggested, because he would grow hay for the goldfields market, and his hay crop off 200 acres should represent more than twice the value of the 12-bushel wheat crop at 2s. 6d. I think it must be obvious to all that there is a great deal of waste going on wherever a farmer is cropping a smaller area than he can handle. His own energies are going to waste, and his machinery is not being put to good account. Surely there is no man who will not try to get out of such a position, and there is certainly no place in the world where he can get out of it so easily as here. In the old days the bank advanced 50 per cent. against improvements, then increased it to 75 per cent., and under the new Act it lends the whole lot up to £300. The interest is only 5 per cent., and for the first five years the borrower pays interest only. Then he has 25 years in which to repay the principal. No other industry could receive such favourable treatment."

But it pays the State to do it ?

" Of course it does. There is no other industry the development of which gives the State similar advantages, and there is no other industry that can furnish the same security for money lent. Of course some members of the Labour Party on the goldfields are trying to raise an agitation against the concessions made to the producer by the Moore Government in the way of freights and wharfage, but happily the great body of public opinion throughout the State is with us in saying that the prosperity of Western Australia depends upon the settlement and the utilisation of her agricultural lands. Let me again express a hope that the farmers throughout the State—particularly the small farmers round about this district—will get to work on that £400,000 which the Government wishes to see spent in preparing waste lands for the harvest."

WORK OF THE GOVERNMENT LABOUR BUREAU.

REPORT FOR FEBRUARY.

Mr. James Longmore, Superintendent of the Government Labour Bureau, has forwarded to the Under Secretary the following report of the operations of the Labour Bureau for the month of February, 1907 :—

Perth.

Registrations.—The total number of men who called during the month in search of work was 825. Of this number 617 were new registrations and 208 renewals, *i.e.*, men who called who had been registered during the month of January. The trades or occupations of the 825 applicants were as follows:—Labourers, 213; handy men, 82; handy lads, 58; farm hands, 48; carpenters, 41 ; cooks, 27 ; bushmen, 19 ; gardeners, 19 ; miners, 16 ; drivers, 15 ; blacksmiths, 13 ; grooms, 13 ; painters, 13 ; hotel hands, 9 ; navvies, 9 ; yardmen, 8 ; farm lads, kitchenmen, and plumbers 6 of each, bakers, bootmakers, stonemasons, and strikers, 5 of each, butchers, bricklayers, brickmakers, clerks, dairymen, fitters, and firemen, 4 of each, caretakers, orchardists, and survey hands, 3 of each, and 47 miscellaneous.

The engagements for the month numbered 289. The classification of work found was as follows:—Labourers, 144; farm hands, 35; handy men, 29; woodcutters 14 ; boys for farms, 7 ; cooks, 5 ; seamen, 5 ; blacksmiths, gardeners, and navvies, 4 of each, bushmen, drivers, sawmill hands, yardmen and kitchenmen, 3 of each, and 23 miscellaneous.

Kalgoorlie.

Registrations.—The applicants for work numbered 64. There were 44 new registrations and 20 renewals. The classification was as follows :—Labourers, 21 ; handy men, 16 ; bakers, bricklayers, cooks,engine-drivers, grocers, handy lads, and woodcutters, 1 of each.

Engagements.—The engagements were 5, classified as follows :—Woodcutters, 2 ; handy men, 2 ; yardmen, 1. The female servants who called numbered 20. The classification was as follows :—Cooks, 6 ; generals,3 ; laundresses, 2 ; housemaids, 2. There was one engagement, viz., cook.

Northam.

Registrations.—There were 22 applicants for work, classified as follows :—Labourers, 8 ; farm hands, 6 ; handy men, 3 ; farm managers, clearers, grooms, cooks, and gardeners, 1 of each.

Engagements.—The engagements numbered 14, viz., labourers, 7 ; farm hands, 4; handy men, cooks, and clearers, 1 of each.

Women's Branch, Perth.

Registrations.—The new registrations for the month were 120, and the renewals 32. The classification was as follows :—Housemaids, 32 ; cooks, 26; laundresses-charwomen, 24; generals, 21; light generals, 21; housekeepers, 9 ; waitresses, 8 ; useful girls, 7 ; lady helps, 6 ; and 8 -miscellaneous.

Engagements.—The engagements for the month were 76, classified as follows :—Laundress-charwomen, 36 ; generals, 12 ; useful girls, 5 ; cooks, 5 ; cook-laundresses, housemaids, light generals, 4 of each, and 6 miscellaneous.

General Remarks.

The number of men who called at the Central Office, Perth, during the month in search of work was 825, being 12 short of that for January, and 74 in excess of that for the month of February last year. The engagements totalled 289, viz., 167 for country districts and 122 for town ; this total is 103 in excess of that for February last year. Private employers engaged 236, this being 41 in excess of that for any other month of February since the Bureau has been opened. The Government departments engaged 53 men, which includes 35 men for ringbarking in the Upper Blackwood District and 6 men for railway work.

TRIALS OF GRASS SEED.

By T. St. Jack.

The following account of the cultivation and growth of the various grass seeds received from the Department for experimental purposes is submitted for your information. The check plots were sown in the order following:—

1. Tall Oats.—Germination very even; growth slow till spring, then it ran up very fast to an average height of 2 feet 6 inches; green at present.

2. Tall Fescue.—Germination even; growth slow but well maintained. It is now the greenest of all the check plots. Very suitable grass.

3. Burnett.—Germination uneven, but plants very strong. I expect this fodder plant to do well here once it is established. Green now.

4. Chicory.—Germination uneven; plants fairly strong; green.

5. Hungarian Forage.—Germination poor; growth poor, uneven; green now.

6. Wallaby Grass.—Very few plants of this seed grew, and what did, did very poorly.

7. Cocksfoot Grass.—Germination and growth all that could be desired. Has done the best of all the grasses. Green now.

8. Timothy Grass.—Germination good; growth good. Ranks next to the Cooksfoot. Green now.

9. Rib Grass.—Germination good; growth uneven. Partial failure. Withering now.

10. White Clover.—Germination uneven; growth uneven. Not very suitable. Withering now.

The foregoing fairly represents the growth in the mixture, the Cocksfoot and Timothy being in the lead.

Conditions.—The conditions were very unsuitable for best results, as the time they were sown was too late, the ground for the most part being sodden with moisture.

Visitors.—Fifteen visitors inspected the grasses, and were pleased with the growth of the several grasses that done well.

In conclusion, I shall be pleased to know at your earliest if you intend carrying on these interesting experiments again this year.

I may state that I have some land fallowed up, and would suggest to you sending the seed, say, about the middle of April.

I have been trying other grasses, viz., Paspalum, Cow Clover, and Prairie. These have done fairly well. I have also tried some salt bush, and this is doing really well.

ON THE LAND.

CHILLED FRUIT COMPETITION.

ROYAL SOCIETY TAKES ACTION.

The secretary of the Royal Agricultural Society, Mr. Theo. R. Lowe, has issued the following circular:—

With a view to assist the fruit display at the next annual show, to be held at the end of October (October 29—November 2), my committee are pleased to say that the Minister for Agriculture has placed at their disposal storage sufficient to enable them to carry out a chilled fruit competition.

It may not be possible to successfully "cool store" the most perishable of stone or soft fruits until the end of October, but it certainly is worth trying to store until, say, the end of May. With this object in veiw, my committee are offering special prizes for the best collection of soft or stone fruits (such as peaches, plums, nectarines, apricots, grapes. etc.):—First prize, £3 3s. (or Society's silver medal); second prize, £1 1s. (or Society's bronze medal); third prize, 10s.; fourth prize, certificate of merit. Entry Fees—Members 2s. 6d., non-members 5s., each entry. Entries close March 20, 1907.

No stipulations as to quantity or number of kinds of fruits; any one exhibit must not exceed ten cases. Fruit received at any time before entries close. The conditions are:—1. All entries received subject to the 1906 Show Regulations and the ordinary rules of the Society. 2. All fruit to be grown in this State, to be the property of and to be grown by exhibitor, and to bear the name of variety. 3. Exhibits must be delivered to the Government Refrigerating Works not later than March 20. 4. The Society reserves the right to reject any exhibit if considered unsuitable for storage purposes. 5. The Society reserves the right to repack, destroy, or dispose of any fruit which it considers may injure or contaminate other specimens, or for any other reason. 6. All exhibits are placed under the direct control of the Society and Mr. Cairns, the manager of the works, by whom the fruit will be frequently inspected. 7. Cases must be distinctly labelled, bearing only the address of the "Government Refrigerating Works," the exhibitor's number as supplied by this office, and particulars as to weight or number of contents. Judging will take place on a date to be fixed by the committee.

Mr. Cairns, manager of the works, says:—"The fruit for this purpose should be very carefully selected, fully developed and matured, but not over-ripe—indeed, not nearly ripe enough to be considered 'prime' for the table. It must be specially free from bruises. The ordinary fruit sent in for storing is too ripe, and has received such rough handling that it will not keep any length of time. In grapes, particularly, one bruised berry is enough to ruin the whole bunch, and perhaps the whole case. Any fruit that contains a delicate flavour is exceedingly sensitive to, and retentive of, any rank odour, such as resin, so often found in the Oregon pine used for the ordinary market cases. Exhibitors should, therefore, see that cases used are free from odour. I am sure that much good can be done by this class of experiment, and I anticipate that the exhibitors will be well pleased with results."

SILO.

Mr. J. F. Carlton, Machinery Merchant, Sydney, has just completed the construction of a silo for Mr. J. A. Niland, of the Howard Estate, Tarro, on the Hunter River, and he believes that it is the first privately owned tub on the North Coast. The model followed was that at the Newington Asylum and the Hawkesbury college, with a few alterations. The diameter is 18ft., and the height 30ft. which, at the American estimate of 45lbs. of silage to the cubic foot, gives a capacity of 150 tons. Farmers and station holders will be interested in the cost. Mr. Niland paid for his silo, complete with an elevator, a 6-h.p. Tangye engine, and boiler, and a cutter capable of chaffing from four to six tons of corn stalks an hour, the sum of £345. This may seem excessive, but the building was of the best materials throughout, and the sum includes every expense. It is certainly in striking contrast with the Hawkesbury College estimate of £45 for a hundred-ton tub silo. The walls are of 7½ x 2½ oregon, with slip tongues, supported by ¾in. iron bands 3ft. apart. Each band is in five sections, with four knuckle joints, and terminating ends with 12 inches of thread, passing through 6 x 6 ironbark posts. The foundation is of ironbark logs, octagon shaped, with the surface adzed level. The roof is of malthoid.

Mr. Niland has no trouble in showing that the silo is a capital investment. He is at present milking 60 or 70 cows, and his feed bill for last winter, when his district was suffering keenly from drought, was close to £100. With a silo he could have had his own supply. He estimates that the silo will pay for itself in the increased butter from his herd within a couple of years. He is at present filling the new structure with green chaffed maize, catching the corn milk in the cob. At an early date Mr. Niland purposes a second silo, and his elevator has been so arranged to feed both buildings. From the silo there is a tramway to the cowshed, and down between the heads of two rows of bails, which are equipped with boxes on an axis, so as to tip and clean easily, similar to those at the Newington Asylum. Mr. Carlton, who is making a specialty of silo construction, has other inquiries from the north, and he believes that Mr. Niland's enterprise will be followed by several dairymen and graziers. If one or two firms like this will take the business seriously in hand and offer farmers easy terms of payment, there is no doubt that the silo will soon cease to be a curiosity in the State.

FLAX GROWING AND MAKING.

By Percy G. Wicken

Among other interesting exhibits seen at the Exhibition of the Chamber of Manufactures recently held in Perth was a flax-extracting plant. This plant has been obtained by the Department of Agriculture for the purpose of demonstrating that flax growing could be made a profitable industry to the farmers of this State.

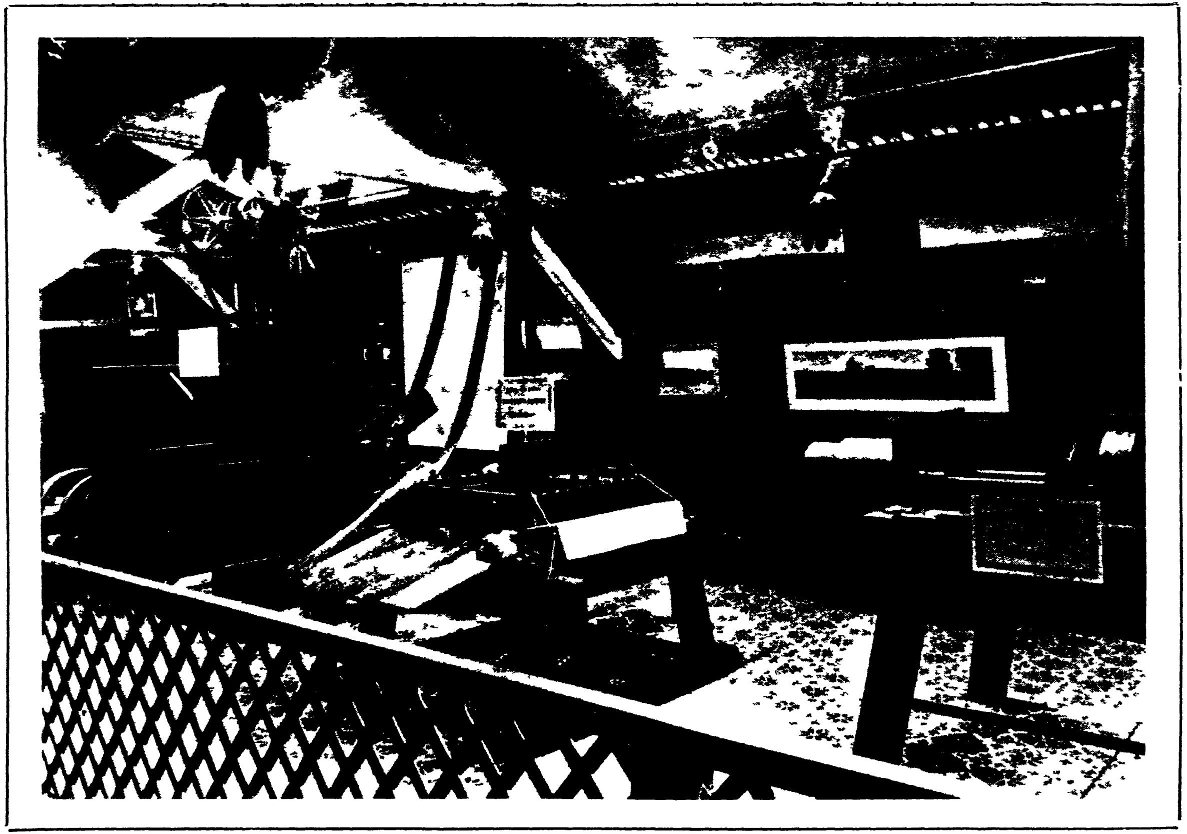
The flax or linseed plant is a useful one for many purposes. In the first place, it can be profitably grown for the seed alone, which can be readily sold on the market, and is worth about 20s. to 22s. 6d. per cwt. An average crop should give about 10 bushels or 5 cwt. to the acre, and at this price the crop would pay as well as wheat. Apart from the production of seed, there is the flax to be obtained from the straw, and at a low estimate 5 cwt. of flax should be obtained from an acre, and as this flax is worth £40 to £45 per ton, this, in addition to the seed obtained, should make the crop a highly payable one.

Although the flax plant is one often looked on as requiring a moist situation, this is not altogether correct, as it will not thrive in a very wet locality. The plant likes a dry, loose soil, which must be well cultivated. It matures early in the spring, and ripens its seed about the same time as the cereal crops. As a general rule, linseed will thrive under the same conditions as the wheat crop, provided that the ground is deeply worked and free from weeds. The soil must be warm and well drained; it is not likely to succeed on wet, cold soil. There are several varieties grown in Victoria, and these are "Riga," "White-flowering Belgium," and "Large Red or Calcutta seed" ; this last variety is grown mostly for making linseed oil, which is pressed from the seed.

The quantity of seed per acre varies according to whether the plant is required to be cultivated for seed only, or for the fibre; if for seed only, ½ to ¾ bushel is sufficient, as it is necessary to encourage the plant to stool out so as to raise the greatest number of seed heads; if sown for fibre as well as seed, the plants will want to be closer together, and one bushel or a little more per acre will be required. The seed should, for flax purposes, be sown broadcast, either by hand or with an ordinary broadcast sower. The seasons vary to such an extent that it is impossible to make a hard and fast rule as to time to sow, but as a general rule it should be sown about the same time as wheat and oats, on fallow ground, the object being to get the plants well up, but not too forward, before the cold weather sets in; if sown too early, they become too forward, and as they cannot be fed off like wheat, they come out in bloom too early to mature their seed. When the rains fall early and the wheat is sown early, it would be as well to leave the linseed a little later; but when the rains are somewhat late, the seed should be sown as early as possible. Linseed is not easily injured by frost, and very little trouble can be expected in our climate from this source. Many farmers think that the linseed plant cannot be sown before the spring, but this is a mistake. No doubt the growth of the spring-sown crop is more rapid, but if the weather becomes dry before the plant has a root hold of the ground, the growth ceases, and the plant becomes stunted. Taken as an average, April till July is the time to sow—the earlier month in the Eastern districts, and later as we get further south and in the more humid districts.

Linseed should not be sown deeply, as it is only a small seed, and if covered too deeply fails to germinate. The surface soil should be brought to a fine tilth and the seed sown on the surface and covered by dragging a brush harrow across it. If the ground is friable a light roller will answer the purpose; but if clayey, will make the surface soil too hard. Linseed or flax requires a clean soil, and all weeds likely to interfere with the growth should be removed. For this reason the crop is often grown on new land, as if any quantity of weeds gets mixed with the straw it interferes with the work of obtaining the fibre. The seed should be allowed to ripen before the plant is harvested. It was at one time thought that the plant could not be grown for both fibre and seed, and that if fibre was required the plant had to be cut in its flowering stage; but this idea has been proved erroneous, and experience has demonstrated that the matured plant produces the best flax. The flax plant can be harvested with the reaper and binder the same as cereals, and should, after cutting, be stooked up and allowed to dry. The binder should be set to cut as near to the ground as possible. When carted in from the field the grain is threshed out by passing the head of the plant between two rollers, which break the seed bolls, and the seed falls out. A special machine is made for this purpose, and it is not necessary for the bundles to be untied.

Before the flax is ready for the flax-extracting machinery it requires to be retted, and this consists of rotting the outer covering of the stalk so that it can be removed from the fibre contained inside. There are three methods by which this can be done.



Flax-making machinery, exhibited at the late Manufacturers' Exhibition, Perth.

First.—Dew retting. This is perhaps the simplest and best method for a farmer to carry out, and has been employed for ages past by those engaged in flax cultivation. The process of retting consists of destroying the gum which binds the woody portion of the plant to the fibre. By stooking the straw in the same way as wheat is made into hay, the dew will damp the straw every night, and as the plant dries up again during the day it gradually destroys the gum. This process is very slow, and takes about three weeks or more, according to the climate. It is a cheap way of treating it, as the only expense is the turning of the sheaves now and again.

Second.—Retting by soaking in water for a time. The flax straw is stacked in a pool of water or running stream until all the gum is taken out; the straw is then taken out and dried, and is ready for use. It is necessary that care should be exercised to take the flax out of the water at the proper time, as if it is soaked too much the fibre loses its strength, and is not so valuable; and if not soaked enough, the woody coating will not come off. In warm weather two or three days is sufficient, but when the weather is cold it takes somewhat longer.

Third.—A process has been discovered by which the flax may be retted or de-gummed by a chemical process in two hours. A company has been formed in Victoria for the purpose of buying the flax straw and treating it by this process, and perhaps it will prove more profitable to the farmer to sell his straw direct to a company for treatment than to treat it for himself. The company are having extensive works erected, and when completed they will no doubt be offering a regular price for flax straw, and growers will then know whether it will pay them to grow it or not.

As soon as retted the flax is ready for treatment, which consists of passing it through a machine called a "breaker." This machine consists of a number of fluted rollers, which break or crush the straw so that the woody part can be easily separated. After passing through the breaker the broken stems are put through a "scutching" machine, which consists of two revolving fans which beat off the wood from the fibre and leave the fibre fit for market.

These machines were at work every day at the Exhibition lately held in Perth, and should demonstrate to settlers that we have an important industry so far left untouched in this State.

Samples of flax treated by similar machinery in Victoria fetch £45 per ton in the Melbourne market. Last year Great Britain imported flax and tow to the value of £3,185,475. Tow is only the broken pieces and odd strands of the flax which may be broken off by the scutching machine, and which are worth about one-third of the ordinary fibre.

In the agricultural areas of this State there are plenty of places where flax could be successfully grown, and as the price of wheat has now come down to the level of the Eastern States it will pay settlers to turn their attention to other crops from which a greater profit can be derived.

As the plant for treating the flax straw is now in the State there should be no difficulty in arranging with the Department of Agriculture to either treat the straw or to lease the plant to settlers who will grow an experimental crop.

A PARASITE OF THE SHEEP.

THE CYSTICERCUS TENUICOLLIS:

ITS PROGRESS AND DEVELOPMENT.

A CYCLE OF INFESTATION.

By F. CLUTTERBUCK.

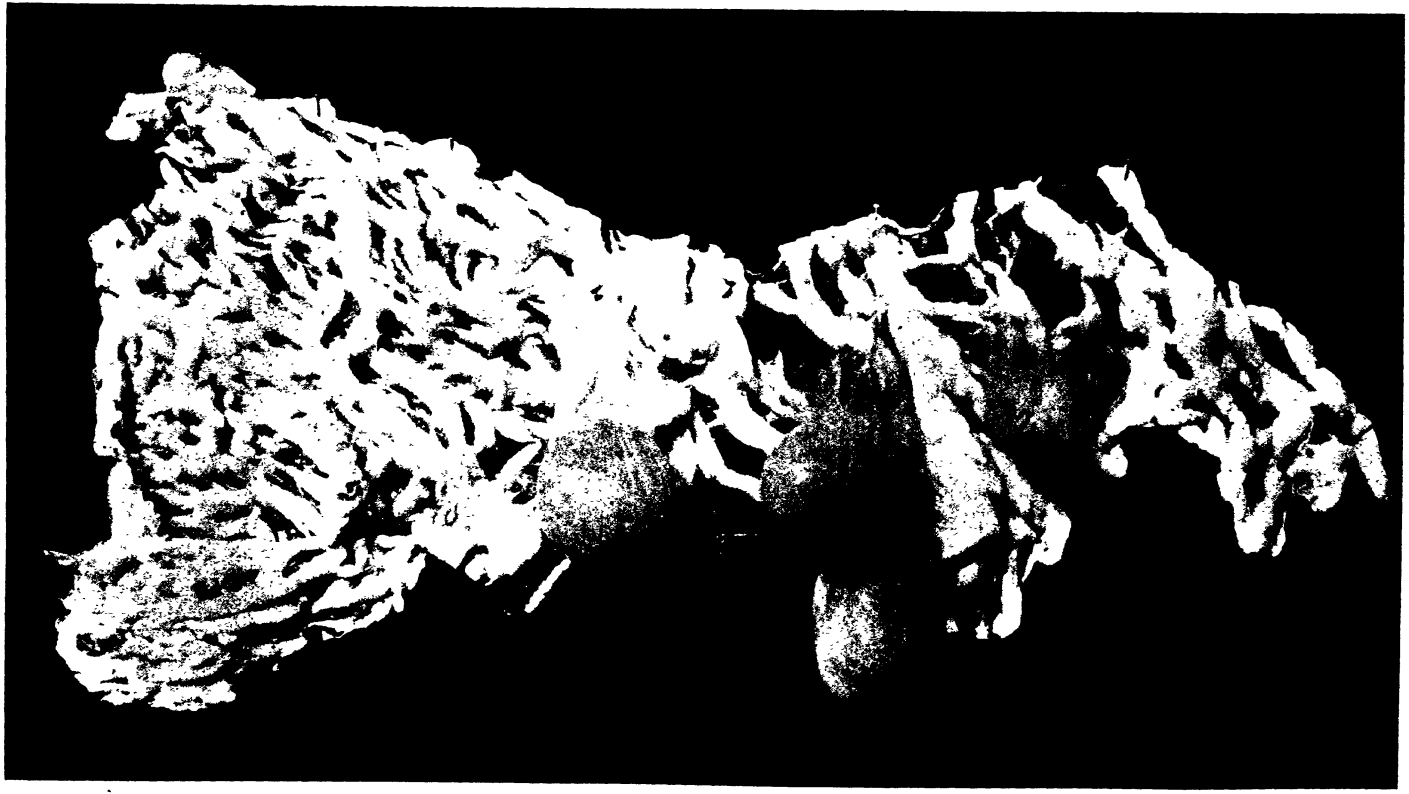
The *Cysticercus tenuicollis* is the cystic form of a tapeworm (*Taenia marginata*) which inhabits the intestines of the dog.

In the course of about 12 months inspection at the Fremantle Abattoirs I have noticed that this particular parasite is second to none in point of frequency in the sheep. Young sheep are no doubt more frequently affected and to a greater degree than older sheep. The reason of this is probably because young sheep, and especially lambs, have, like all new arrivals on this earth, a penchant for foraging amongst dirt and other matter which older and more experienced animals pass by; consequently more eggs are swallowed by these habits. However it is a fact that sheep of all ages and from every locality suffer more or less from an invasion of this parasite.

Method of Infection.

The *dog,* in the act of defecation, passes the eggs of the worm, and these are picked up with the grass or they may be washed into the drinking water of sheep by the rains. The eggs on reaching the stomach of the sheep are acted upon by the internal heat which hatches and liberates the larvæ. The *embryos* when freed from the eggs enter the blood vessels of the intestines and are carried by the portal circulation into the *liver,* the *lungs,* and the *heart.*

Recently I noticed what proved on close inspection to be two or three very small cysts of *Tenuicollis* embedded in the wall of the heart. A paleness and slight bulging of the tissue were the only external evidences. I think, however, it proves conclusively that these embryos are carried along by the portal circulation. In the livers they are seen in great numbers, especially in young sheep, and what is most interesting we are able by examining sheep of all ages and from different localities to watch and follow the progress and development of these parasites. I have seen livers absolutely swarming with them, showing here and there traces of having ruptured the capilliaries in their endeavour to burrow through that organ. In one liver I found an accumulation of blood of tumor-like growth which contained hundreds of these larvæ in a degenerating stage, and completely imprisoned by this wall of their own making. After burrowing their way through the liver they wander or are carried to various parts of the abdominal cavity where they become encysted. They are found encysted on the surface of the liver, the omentum, the mesentery, the peritoneum



Full grown cysts (*Cysticercus tenuicollis*) in the caul fat (*omentum*) of a sheep. Note the hanging nature of the cysts and their clear watery contents.

the uterus, and the bladder; in fact anywhere in the abdominal cavity. At this stage of progression the development is most interesting. It would appear that wherever the embryos cling or settle in the cavity, nature immediately surrounds them with a thin membraneous wall which is made up at the expense of the adjoining peritoneal tissue. Whilst thus surrounded development still goes on, and in the progress of evolution each embryo assumes a shape and size resembling a small apple-seed; later on this seed-like arrangement unfolds itself, as it were, becomes membraneous, transparent, baggy, and fills with fluid. It has then reached the commencement of the cystic stage, and measures about one-fifth inch with a small white dot showing at one end, which is, I believe, called the "neck." The cyst continues to grow until it reaches the size of a hen's egg when the weight of the fluid it contains causes it to become suspended from whatever organ it may be attached. In this situation it is the adventitious cyst, or rather sac, that is suspended, and not, as some suppose, the true cyst.

It is now fully developed and is known as the adult cyst. Upon rupture of the adventitious cyst and freeing the true cyst it is found to consist of a thin membraneous bladder filled with fluid and having an attenuated portion or "neck" at one end. Inside the "neck" the head and hooklets of the *Taenia* are hidden, and a short thread-like membrane may be seen hanging down from the "neck" and floating about in the cyst. By careful manipulation this thread-like arrangement can be taken out intact, and, if examined under the microscope with a low power, the head and hooklets will be distinctly seen at one end. Viewed laterally the head has apparently two suckers at its extremity with a double circlet of bluish-tinted hooklets radiating from a centre just beneath and between the suckers. This is the cystic form of the (immature) *Taenia marginata,* and is undoubtedly the most dangerous stage. Further progress and development so far as the sheep is concerned is ended, and must after this stage take place in the dog to complete the cycle of infestation.

We know that at most sheep stations mutton forms the staple meat food, and frequently sheep are slaughtered for human consumption, and the internal organs thrown to the dogs; thus the numerous adult cysts are swallowed with the meat to which they are attached. The action of the gastric juices and internal heat ruptures the wall of the cyst, the head of the immature *Taenia* is freed and clings to the wall of the intestines by its suckers and hooklets from which springs the tapeworm (*Taenia marginata*).

Inspection.

In the interests of the dog, all affected organs should be destroyed so that these animals may not eat thereof and become infected with *Taenia marginata.* But it seems an exaggerated form of meat inspection to seize such organs as livers and condemn wholesale, because of a few specks of embryos which can be easily removed and the organ passed; since it is proved conclusively that the larva stage, or even any stage where development has been arrested by degenerating influences, will not harmfully infect the dog.

However, disseminated lesions of the embryo stage work such damage to the tissue as to certainly render the livers unmarketable. In this condition large numbers are condemned annually. Strange it is that the true source

of danger of infestation can, by reason of its situation, be easily removed from any organ without calling for its condemnation. The parasite seldom if ever develops in an organ.

The remedy lies at the door of the sheep farmer, whose dogs should be forbidden access to the internal organs of any sheep until they are thoroughly cooked and all trace of the parasite destroyed.

EXPERIMENTAL APICULTURE.

By Dr. E. E. Phillips, U.S. Dept. Agriculture.

(Extracts from address before the National Beekeepers' Convention, Chicago.)]

There is room for improvement in hive appliances, extractors, forage and other things, but the one place where there is the greatest need for improvement has been generally neglected by beekeepers; I refer to the improvement of the bees themselves. All bee-keeping is pre-eminently breeding work. The honey is the product and the ultimate object of the industry, but the working problem is strictly one of breeding. The beekeeper can increase his output by improvement in two places; first in the manipulation and food supply; and second, in the bees themselves. Manipulation and food supply are being discussed continually, but we get very little real information on the improvement of bees. I do not refer now so much to the introduction of new races, but particularly to the selection of breeding stock.

The Italian race of bees was introduced into this country about 1860, and the credit for this important introduction need not concern us at this time. The important thing now is to examine the situation to see how much this race has been affected by breeding in the hands of the bee-keepers of this country since its introduction. From about 1860 on there has been in some quarters an interest in breeding this race for colour, and this has been done very successfully, several different breeders having taken up this line of work and succeeding, by selection, in producing five banded Italians. As an example of what can be done by careful selection among bees this work is of value to us. Other breeders have selected for gentleness and, since this character is not as measurable as colour, it is harder to make definite statements concerning the results obtained, but it is evident that either intentionally or accidentally, some good has been done along this line.

But the main object in the keeping of bees is honey production; how much has the average output per colony been increased in the past forty-five years? Every bee-keeper knows that the more populous the colony during the honey flow the more surplus honey stored, other things, such as honey flow and weather, being equal. The problem then reduces itself very largely to the fecundity of the queens, and the question may be changed so as to ask how much the prolificness of Italian queens has been increased in the past 45 years. Another very important factor in honey production is the eagerness with which bees go after nectar, and a third is the tongue-length enabling them to reach the nectar in long corolla tubes. Italians lack the eagerness which is possessed by Cyprians, but there are Italian colonies which have it to a marked degree. Several strains of tong-tongued or " Red Clover " Italian bees have arisen in the past few years, but what is the history of the strains ? When a queen is sold and introduced into a honey-producer's apiary, before many generations the progeny cease to work on red clover, if they ever did; for the reason that proper selection is scarcely ever practised, and there is not close enough breeding. This is certainly due to lack of proper methods in following up the breeding.

We may conclude then, that prolificness, vigour, and tongue length, which frequently appear in Italian bees are not ordinarily used to proper advantage by the majority of bee-keepers. Anyone reading the reports of the early Italian importation will see that the average per colony throughout the country is not much better than it was 45 years ago, and in some strains there is reason to believe that it is less. Of course this is not true in certain apiaries, but I feel sure this holds for the country in general, and I am inclined to think that prolificness in some strains of this race is actually decreasing.

It is natural that we should want to know why this is. There is but one answer it seems to me, and that is that queen-breeding in honey producing apiaries is usually not done with a knowledge of the common principles of breeding as practised on other animals and on plants. Careful breeders of almost every other form of domestic animals know to an ounce what their stock produces, but how many bee-keepers can give this sort of a record, and it is commonly recognised by breeders that without records they work in the dark.

Breeding of both plants and animals, with a view to the betterment of stock, is now attracting wide attention; this work is not confined to experimental stations and wealthy individuals, but the farmers of the country are recognising the fact that there is more money in choice stock than in scrub animals. Let me quote General Burchard, associate editor of Hoard's Dairyman, a short extract of an address to dairymen of Wisconsin, what he called " The Cow Breeders' Short Catechism."

Q. How many kinds of cows are there ?

A. Three.

Q. What are they?

A. Dairy cows, beef cows, and combination cows

Q. What is a dairy cow?

A. One that has the ability to turn all the food she may eat and digest, over and above that required for maintenance, towards the udder, there to be transformed into milk.

Q. What is a beef cow?

A. One that turns her surplus food into flesh and fat.

Q. What is a combination cow?

A. One that tries to take both forks of the road and never gets anywhere.

Q. What causes the difference in cows?

A. Heredity.

Q. What is heredity?

A. The biological law by which living beings tend to repeat themselves in their descendants.

Cattlemen realise that they must breed for one thing in cows, and I believe that bee-keepers should settle down to one line of selection. Honey-production, gentleness and colour do not necessarily go together, and the chances of finding all these combined in one colony are small. Which should be chosen? Honey is the object of most bee-keeping, and that then should be the one and the colony line of selection for the honey producer. You may arrive at this by selecting prolificness, or tongue-length, but not both without great difficulty, and therefore, prolificness, which is vitally necessary, should be the first consideration.

In the extensive work of the Main Experiment Station on egg laying, in hens it has been found that some of the best formed hens were poorest in laying ability, and vice versa. They, therefore, select for number of eggs and let everything else go. In this series of experiments they begin with a flock with an average of 120 eggs per year, and now have many individual hens which produce from 200 to 250. This, too, has been done in a very few years.

The application of statements concerning stock may be transferred to bees, and, therefore, does it not seem time for the bee-keepers to arise and join the procession? Let the honey-producer drop all fads of colour, gentleness, and similar things, and breed pure stock for honey, and no longer aim at an "all-purpose" bee.

Allow me to mention here an institution worthy of notice; there was started, about two years ago, an organisation known as the American Breeders' Association, and breeders of both plants and animals are uniting in the study of the principles of breeding with a view to improvement of their stock. Breeders of all kinds of plants, and animals have seen that they have interests in common, and there is absolutely no ground for a belief that the same principles of breeding do not apply to bees, and I believe no one claims it, yet none of our queen-rearers have seemingly cared enough about the information to be derived, to pay the one dollar membership fee which entitles the member to a volume of proceedings worth five dollars to any breeder. According to the directory in the first volume the total number of members interested in bee-breeding is one, and that one is not included in the last published list of members of the National Bee-keepers' Association. I am happy to say that since then one other person interested to some extent in bees has joined, and he is also a member of the National. I would urge that the National Bee-keepers' Association join the Association, and then let every member who cares anything at all about the improvement of his bees do likewise. The fee is small and benefits large. This scarcity of bee-keepers may be due to the fact that the organisation has not been properly mentioned in bee journals. I trust that the editors of the journals will look into this Association and then give it a little free advertising, for it is a worthy object, and is in no sense a commercial enterprise. The editors can do great good in a matter of this sort, because they have an easy means of access to the men who should be interested.

Since much scientific work has yet to be started in queen-breeding, it may not be amiss to enumerate some of the approved principles of breeding and apply them to bees. You will notice that I say queen-breeding, not queen-rearing, for there is a vast difference.

The two great factors of all life, both plant and animal, which make improvement possible are Variation and Heredity.

It is proverbial that no two individuals of any one species of race of animal or plant are exactly alike, and this of course applies to bees. During the past winter I have examined five hundred workers and one thousand drones, making in all between five and six thousand measurements, and the result showed remarkable variability in this species. Drones vary considerably more than workers in colour and size, and although I did not have large numbers of queens to measure, it is well known how variable they are. These measurements were of structures, but equal variability is present in the ability to do the work, either of egg laying or honey producing. as witnessed by the inequality in stores and population of different colonies. There is, then, enough variation.

The great other fact in nature which makes it possible for man or nature to improve a species or race is at first thought directly opposed to the foregoing : "Like begets like," is also true. A prolific female produces daughters that are also prolific, though not all to the same degree; but it is an established principle of breeding that excessive prolificness in a female tends to produce in her offspring polificness at least above the average for the race. If variability existed without this hereditary tendency, no improvement could be made, for at every generation the individuals would again vary in all directions. On the other hand, heredity could do nothing for us in our work of selection, were it not for the fact that variations occur, but around a new centre, as it were, in each generation during selection.

The weeding out of undesirable stock is the greatest task of the queen-breeder. He must pursue his work by (1), inducing variation; (2), producing large numbers of individuals; (3),weeding out all undesirable blood by breeding from but one, or very few select animals, and (4), fixing the type. In queen-breeding this means that hundreds of queens must be bred and tested ever year, and a very few chosen to continue the work during the following season; it does not seem best to use as small numbers as do most queen-breeders. The Funks in their work on corn breeding tested five thousand ears which bore no relation to each other, and chose two as breeding stock. Luther Burbank, the wizard of horticulture, advocates even large numbers, having chosen one in ten thousand, from among some of his plants. In queen-breeding we are more restricted by the limitations of any locality, but I think I am right when I say that a breeding queen should be the best in at least five hundred tested queens, and the test is to be made by the actual amount of honey produced in a year compared with the other four hundred and ninety-nine, always assuming, of course purity of stock. Cattlemen use scales, and the Badcock test as the only safe method of choosing the dairy cow; let us use scales in our judjment and disregard colour and other fads when rearing honey producers.

For "fancy" bee-keeping, as practised by many amateurs, colour or anything else that attracts may be used.

Since mating cannot be controlled in bees as in mammals, it will be necessary to have several colonies producing drones, but evey colony chosen for this purpose should have a high honey record of at leas one year's standing, and the queen should be quite as good as the breeding queen. The majority of bee-keepers are notoriously lack in this regard. In many cases the drones of every colony in the yard are allowed to fly, and just so long as this is done we will have no advancement, for this one-sided selection is working against odds that the bee-keeper cannot overcome. In defence of such loose methods, some queen-breeders argue that a very large number of drones are necessary, and that they can be procured in no other way. During the past summer in sixteen colonies in the Arlington yard of the Bureau of Entomology, I produced enough Caucasian drones to stock a queen breeding yard with an output of two thousand queens a year, and this could have been done with half that number to advatage. I may add also that pure matings were secured in the very large majority of cases, alhough that apiary is far from being isolated. I mention this to show that more drones are unnecessary.

We have pedigreed horses and cows, and even pedigreed corn and wheat; why not pedigreed bees? I think I am not asking too much. I hope the day will come when the breeders will advertise as follows : "I am this year using my celebrated breeding queen Smith 168, which is the mother of a colony which last year produced 50 per cent. more honey than my average colony. This queen is the descendant of six purely mated queens, all of which were mothers of colonies producing over three hundred pounds of honey a year. For drones I am using five queens, all of which are mothers of colonies which last year produced over three hundred pounds each." This is not visionary by any means, for it is exactly what breeders of other stock are doing, and it is pleasant to note that some wide-awake queen-breeders are doing almost that now.

There is the recorded case of a colony producing one thousand pounds of honey in one year; of course this was in a good season, and under careful manipulation, but think what a valuable queen was lost when that queen was not made the mother of a long line of breeders to be distributed all over the United States. Few honey producers are so situated that each colony can produce any such amount of honey, but it is necessary to aim high.

There are too points which require consideration. The best is the desirability of breeding the race pure. Crosses or hybrids are so variable that they should be avoided except when necessary. Let me quote from Dr. W. E. Castle, of Harvard University, on this point :—

"Since crossbreeding is likely to modify characters, even when these conform to the laws of alternative inheritance, and is certain to modify them when they give blended inheritance; it should be practised with supreme caution, and only by the breeder who has a definite end in view and a fairly clear idea of how he is going to attain it.

"The purity of standard breeds should be carefully guarded, and much attention should be given pedigees, for even when individual excellence is not apparent, it may be present in recessive or else in a latent state, which suitable mating will bring into full realisation, provided the ancestors were superior animals.

"At the same time the breeder should be on the lookout for individual peculiarities of merit. And he should not be discouraged if these are not transmitted to the immediate offspring. A simple character which disappears from the children, but re-appears among the grandchildren, can at once be made a racial character, for it is recessive in heredity."

The breeder who uses a mixture of races for breeding is doing something which is very likely to cause him trouble. There is very little necessity under present conditions for this, since a good race may be chosen as a foundation stock which can be surpassed by crossing with difficulty, and careful and systematic selection within the race will bring almost as good results with the great advantage of more stability, a point of vital consideration. Let me make this point a little clearer. There is reason to believe that when some queen-breeder takes up the improvement of bees by crossing he will outstrip all the rest. He will induce greater variability, and will, consequently, have a greater range of material for selection; he will be unable to combine the desirable traits of two or more races, and at the same time, if proper care is used eliminate the undesirable traits. This can be done purposely only by a person who has a most thorough understanding of heredity and variation, and no one else should undertake it, for there is otherwise too great a danger of bringing out all the undesirable traits and losing the good ones. This, then, is why pure races are generally so essential; when the proper men take hold of crosses they will get great results, but the majority of breeders should not risk the handling of fire in that way, and as for the rank and file of bee-keepers, it is I think absolute folly. A bee-keeper may say that he cares nothing for races; that all he wants is honey. All this is very true, but he cannot afford to overlook the fact that nature has laws which he, with all his independence, dares not disregard. I consider the bee-keeper who fills his apiary with what we may call scrub hybrid stock is a poor bee-keeper.

The second point is the common prejudice against inbreeding. I can do no better on this point than to quote from Mr. N. W. Gentry, who is well-known as an extensive breeder of Berkshire hogs. Mr. Gentry has for years practised inbreeding, and before the Champaign meeting of the American Breeders' Association, in February, 1905, he said:—

"From father to son for generations has been handed down the common belief that inbreeding of animals produces offspring of less vigour, less vitality, less constitution in proportion to the extent to which it is carried on continuously, and this belief seems to have been accepted as true without any proving by the very great majority. My experience has led me to believe otherwise, or rather that such results need not necessarily be true.

"Neither inbreeding nor the reverse will be a success unless matings are made with animals suited to each other; that is, having no weakness in common if possible, and as much good in common as possible. This, in my opinion, is the key to success in all breeding operations, and success will come in no other way. In my opinion inbreeding as a rule is very good or very bad.

"I have watched results of inbreeding in my herd for years, and until I can discover some evil effects from it—and I have not yet—I shall continue to practise it."

In breeding it is generally believed that inbreeding is detrimental or fatal, but, fortunately, breeders are now seeing that the idea is usually without foundation. Of course, inbreeding accentuates common weaknesses, but we should use it in accentuating strength, as it will when properly directed. Think what it would have meant to bee-keeping if the blood of the Cyprian queen, whose bees produce one thousand pounds of honey, had been preserved by inbreeding, and what it will mean if some of the present good queens are kept by this method. I do not advocate universal inbreeding, for it is well-known that inbreeding is, generally speaking, not natural, but even in nature, it is frequent, and it is by no means universally true that it is detrimental. Therefore, if there is reason to think that it is best, it should be fearlessly practised. How this prejudice against inbreeding arose I do not know, but we all know how general it is. Nevertheless, it is true that the breeders of stock who now practise it are the ones who are getting results of lasting value. On one or two points I do not wish to be misunderstood. I do not wish to condemn the breeding for colour or for long tongues. I really consider colour selection a fad, but there are those who prefer the lighter coloured bees, and as long as there is a market it will pay to select them. Long tongues would be an advantage doubtless, but in whatever way we are breeding let us not forget that increased honey production is the essential. If these bees have longer tongues, all right and well, but the selection should be made by the scales.—*Canadian Bee Journal.*

GARDEN NOTES FOR APRIL.

By G. Chitty Baker.

As these notes are intended to reach the settler in March, the instructions contained in them should be acted upon wherever suitable.

No time should be lost in getting all ground into proper tilth, ready for seed. In fact everything should be in readiness by the time the first rain falls, as it is then that the best growth is made, before the ground becomes too cold and wet. Not only should the ground be well and deeply worked in order to receive the rains, but a thorough system of good drainage should be also established in order to carry off any excessive wet.

From this out until spring all seed may be sown in the open for future planting.

Cabbage, cauliflower, lettuce, etc., should be well advanced, ready to plant out in the first good shower that falls. In sowing seeds for succession it is far better to sow lightly and often, than thickly and resulting in a mass of thin, spindly seedlings that rarely grow into strong, healthy plants. All plants and seeds from now until spring will do better if sown in rows running north and south.

Broad Beans.—These may be sown extensively now. Almost any soil will suit them; they do not require very rich ground. Providing it has received a good dressing for the previous crop, it will only be necessary to add a little superphosphate. Sow the seed six to nine inches apart in drills four feet apart. Top so soon as flowering commences, keeping down young shoots, as very little is obtained from this extra growth. It is better to plant a few extra rows for a succession rather than try to prolong the bearing of any lot of plants. Broad Windsor and Long Pods are two of the best.

Borecole or Kale.—Plants of this should be ready for planting out and fresh seed sown for succession. Seed sown now should give feed up to the end of the year.

Brussel Sprouts.—Plant out seedlings. It is too late to sow any more seed now.

Beetroot.—Seed should be sown as early as possible. The turnip variety is by far the best for small gardens. The ground should be in good tilth and fairly rich; fresh manure should not be applied, as it tends to make the roots fork and unsightly. The seed may be sown in beds and afterwards thinned to stand about six or eight inches apart; or seed sown every six or eight inches, in rows twelve or fifteen inches apart. So soon as the young plants show above ground thinning and weeding must be commenced, care being taken that plants are left single, as it often happens that two plants will spring from one seed, and, if allowed to grow, neither will mature properly.

Silver Beet, although belonging to the same family, is cultivated for its leaves, the mid-rib of which forms an excellent substitute for asparagus, while the green part is served as spinach. Silver beet is a rank grower, and requires frequent applications of liquid manure, a solution made of 2ozs. of superphosphate, 1oz. of sulphate of ammonia, half ounce of sulphate of potash, and quarter of an ounce of sulphate of iron to each gallon of water will have a decided marked influence on the growth and flavour of the leaves. The leaves should be pulled, and never cut, and if, when boiling, a little lemon juice is added, the appearance is improved; this prevents them from turning black. Soda must never be used. A bed of silver beet, properly cared for, will give pickings for over twelve months. The seed may be sown in beds as for cabbages, etc., from autumn to spring, and planted out when about four to six inches high.

Carrots may be sown either in beds or drills. They do best in a deep, sandy loam. Cultivate same as beetroot.

Lettuce.—Sow largely. Plant out any seedlings available.

Onions.—Sow largely on well prepared beds. If any good bulbs have been kept from last season it is a good plan to plant them now, for seed.

Peas.—All early sorts may be sown, the dwarf varieties for preference. Any good garden soil suits this popular vegetable. Dwarf kinds should be sown four inches apart in rows one foot apart. American wonder, Sutton's earliest marrow, and earliest blue are some of the best.

Parsnips.—Sow a few rows. Care must be taken to cover the seed only very lightly.

Turnips.—Good sowing may be made of this, either in beds or drills. The garden swede is not grown sufficiently. It is very popular where known, the "Orange Jelly" being the best.

Weeds.—All spare time may be utilised in keeping down the weeds, which will grow at a great rate immediately after the first shower, and if allowed to grow will rob the young plants and check their growth.

MARKET REPORT.

The W.A. General Produce Company, 245 Murray Street, Perth, report as follows for the week ending 6th March:—

Business.—During the past week previous activity well maintained; supplies all round plentiful, especially being the case in respect to fruit. Detailed particulars as follows:—

Bacon continues scarce on spot; values steady, with tendency to firm.

Hams.—Selling very well at current rates, and quality giving satisfaction.

Cheese.—Selling well, the greatest demand being for new mild sorts.

Butter.—Very good supplies, both on spot and sources of origin; values have been and continue to be very reasonable from the consumer's point of view.

Eggs.—Local scarce; getting very scarce, and good reliable lots sell readily at quotations.

Potatoes.—Tasmanian just beginning to arrive; some consignments in very bad order, but the next shipment likely to be more matured; local lots very much affected with the worm.

Onions.—Good quality rather scarce, and values on the whole very low, growers in the East selling much under cost to produce.

Chaff.—Good supplies arriving, and quality much better than hitherto; values improving.

Millers' Lines.—Steadily rising since the advent of the recently formed millers' union.

Fruit.—Large consignments arriving daily; values, especially for apples, very low; still many lots condemned owing to fruit fly.

Vegetables.—Supplies only fair; values very firm.

Poultry.—Young fleshy roosters in good demand.

Farm and Dairy Produce.—Bacon, Hutton's 9d. lb., others 7d. to 8½d. per lb.; hams, Hutton's 1s. 1½d. lb., others from 7d. to 1s. per lb.; butter Euroa 1s. per lb., Millewa 11½d. per lb., Hansen 11¼d. per lb.; lard in bladders, 7½d. per lb.; cheese, medium case lots 6¾d. to 7d. per lb., loaf 7d. to 7¼d. per lb.; eggs, new laid 1s. 10d. to 2s., country lots 1s. 4d. to 1s. 8d. per dozen; potatoes, local, newly dug, 7s. to 10s. 6d. per cwt. Tasmanian 7s. 6d. to 8s. 6d. per cwt., Victorian 6s. 6d. per cwt.; onions, 6s. 6d. per cwt.; chaff, from £2 7s. 6d. to £3 12s. 6d., per ton truck lots; bran, £5 10s. per ton; pollard, £5 10s. per ton; flour, local, £8 to £8 5s. per ton; oats, N.Z. 3s. 6d. per bushel, Algerian 3s. per bushel; maize, 5s. per bushel; wheat, truck lots, 2s. 10d. per bushel; oil cake, £8 per ton.

Fruit.—Oranges, Italian, 22s. 6d. per case; lemons, Italian, 21s. per case; passion fruit, from 2s. 6d. to 5s. 6d. per case; grapes, from 2s., 3s. 6d., 4s. to 6s. 6d. per case; figs, 1s. 6d. to 3s. 6d. per case; peaches, 2s. 6d., 3s. 6d., 4s. to 9s. 6d. per case; nectarines, 4s. 6d. to 10s. 6d. per case; plums, from 5s., 6s. 6d., 8s. to 12s. 6d. per case; apples, dessert, from 2s. 9d. to 3s. 6d., 5s. to 8s. per case; do. cooking, 2s., 3s. 6d. to 5s. per case; pears, dessert, 5s. 6d. to 8s. 6d. per case; quinces, from 3s. to 4s. 6d. per case; rock melons, from 1s. 6d. to 6s. 6d. per dozen; water melons, 2s. to 7s. 6d. per dozen.

Vegetables.—Cabbage, from 4s. 6d. to 13s. per cwt.; carrots, from 7d. to 1s. 3d. per dozen bunches; parsnips from 9d. to 1s. 6d. per dozen bunches; white turnips, 6d. to 1s. 3d. per dozen bunches; French beans, 1d. to 2d. per lb.; green peas, 2d. to 3d. per lb.; marrows, 1s. 6d. to 3s. per dozen; pumpkins, 4s. 6d. to 7s. per cwt.; rhubarb, 1d. to 2½d. per lb.

Salads and Herbs.—Lettuce, from 8d. to 1s. 6d. per quarter bag; spring onions, 3d. to 4d. per bundle; beetroot, from 9d. to 1s. 6d. per dozen bunches; cucumbers, 6d. to 1s. 6d. per dozen; tomatoes, 2s., 3s. 6d., 4s., to 5s. 6s. per case; cress, 1s. per bundle; celery, 6d. to 2s. dozen heads; radishes, 6d. to 8d. dozen bunches; thyme, marjoram, sage, 2s. per tray; mint, 3d. per bundle; parsley, 3d. per bundle.

Poultry for Killing.—Prime young fleshy roosters, 4s. to 6s. per pair; mixed fowls, from 3s. 6d. to 5s. per pair; chickens, 2s. 6d. to 3s. per pair; ducks, from 3s. 6d. to 5s. 3d. per pair; geese, worth 6s. 6d. per pair; turkey gobblers, large 18s. to 22s. 6d. per pair, medium 10s. 6d. to 15s. per pair; turkey hens, large 12s. 6d. per pair, medium 7s. to 10s. per pair.

Game.—Black duck, worth 2s. 6d. per pair; teale, 1s. 6d.; wood duck, 1s. 9d.; hardhead, 2s.; bluewing, 2s.; mountain duck, 3s. 6d. per pair.

Sundries.—Corn sacks, second hand, 5s. 6d. per doz.; bran bags, second hand, 3s. 6d. per doz.; bonedust, £7 10s. per ton; phosphate, £5 10s. per ton; guano, ammoniacal, £5 10s. per ton; guano, phosphatic, £5 10s. per ton; ammonia, 20s. per cwt.; nitrate of potash, 17s. per cwt.

NOTES ON THE CLIMATE FOR THE MONTH OF FEBRUARY, 1907.

This month has been hotter than usual throughout the State South of the tropics. In Perth the present summer has, so far, been by far the hottest since the Observatory was founded, but on the goldfields it was unusually cool during the earlier portion, and, in fact, up to about the middle of February. Then ensued a period of particularly unpleasant weather, during which thunderstorms were frequent, and the atmosphere was very sultry.

The prevailing characteristic of the present summer has been a succession of small "lows" coming down the Indian Ocean a short distance away from the coastline. In some cases they have been traced all the way from Wyndham to Cape Leeuwin. These have been preceded by high temperatures and followed by gradual cool changes, and have occurred about once a week with some regularity..

It is probable that the unusual severity of the summer in West coastal districts and its unusual mildness on the goldfields are both due to the same cause, viz., that the track of the "lows" has been so persistently to the West of the coastline ; very few having come across the land. The great heat sometimes experienced in Eastern districts is usually associated with a "low" which travels from the North-West coast across the interior towards the Bight.

Rainfall has been somewhat irregular and mostly connected with thunderstorms, but on the whole normal.

Pressure has been generally very slightly below the average for previous years.

W. E. COOKE,
Government Astronomer.

The Observatory,
Perth, 6th March, 1907.

The Climate of Western Australia during February, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						February, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
North-West and North Coast:	Wyndham	29·786	29·786	29·888	29·650	93·7	79·5	86·6	102·4	73·0	95·9	79·3	108·3	64·0	915	14	1369
	Derby	29·780	29·800	29·949	29·688	95·3	82·3	88·8	103·8	73·8	94·7	77·5	104·5	69·8	452	8	1342
	Broome	29·777	29·792	29·892	29·648	91·7	77·6	84·6	95·5	71·8	91·9	78·5	101·9	70·3	445	8	1671
	Condon	29·782	29·839	29·917	29·657	94·6	76·3	85·6	107·0	69·5	94·2	77·1	111·0	60·6	336	4	486
	Cossack	29·770	29·778	29·930	29·460	100·0	78·0	89·0	107·0	71·0	97·7	78·4	112·2	61·8	104	2	401
	Onslow	29·804	29·785	29·955	29·682	97·7	77·7	87·7	112·0	71·2	96·4	75·2	115·5	65·8	46	3	46
	Winning Pool ...	29·766	...	29·934	29·611	104·4	76·6	90·5	111·0	73·0	...	...	...	...	188	7	463
	Carnarvon	29·808	29·854	29·948	29·709	89·6	74·8	82·2	102·4	70·0	89·1	71·7	111·2	62·8	*Nil*	...	8
	Hamelin Pool... ...	29·806	29·836	29·950	29·779	97·2	72·3	84·8	106·6	67·0	96·9	69·2	115·4	58·2	28	3	48
	Geraldton	29·882	29·910	30·024	29·753	86·9	67·8	77·4	106·2	60·0	84·9	65·3	110·8	51·0	*Nil*	...	*Ni*
Inland:	Hall's Creek	29·791	29·816	29·900	29·568	93·5	73·4	83·4	102·0	65·0	96·9	74·4	109·0	61·3	369	9	1264
	Marble Bar	...	...	..	.	102·2	77·4	89·8	113·1	72·5	103·9	77·2	116·8	69·0	219	8	455
	Nullagine	29·758	29·776	29·890	29·620	103·7	75·7	89·7	112·6	69·0	100·4	74·6	113·5	60·8	104	4	187
	Peak Hill	29·795	29·800	29·930	29·660	99·0	75·0	87·0	109·0	68·0	96·3	73·2	111·8	58·6	63	7	63
	Wiluna	29·811	29·830	29·994	29·583	96·4	74·1	85·2	108·5	65·0	95·0	68·7	109·5	55·2	87	2	87
	Cue	29·821	29·836	30·008	29·646	100·8	71·1	86·0	109·8	68·5	97·9	71·5	113·8	56·2	161	4	207
	Murgoo	...	...	...	...	100·9	75·2	88·0	106·5	70·2	...	...	...	...	15	1	119
	Yalgoo	29·829	29·845	29·975	29·668	98·4	72·0	85·2	105·0	66·1	96·3	68·5	116·2	53·9	26	2	85
	Nungarra	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...
	Lawlers	29·840	29·863	30·038	29·585	95·1	72·1	83·6	111·0	63·0	93·5	69·9	113·9	51·8	80	3	120
	Laverton	29·886	29·919	30·087	29·609	91·9	68·6	80·2	109·0	58·8	90·4	66·0	110·7	53·3	115	4	115
	Menzies	29·932	29·904	30·120	29·694	93·9	67·9	80·9	106·4	54·8	91·1	65·8	112·8	47·8	10	1	57
	Kanowna	...	...	...	...	91·4	63·4	77·4	106·0	53·0	...	...	...	..	67	4	81
	Kalgoorlie	29·926	29·942	30·194	29·639	92·6	65·0	78·8	107·0	52·9	89·6	63·2	115·0	48·2	49	4	67
	Coolgardie	29·960	29·939	30·209	29·672	90·7	63·5	77·1	106·5	52·0	88·4	61·6	114·3	46·6	98	3	121
	Southern Cross ...	29·930	29·914	30·150	29·760	96·0	64·0	80·0	107·0	52·0	91·5	61·5	112·0	46·0	12	3	47
	Kellerberrin	...	...	...	...	...	...	...	...	...	...	...	...	...	5	1	35
	Walebing	...	...	...	...	96·0	63·9	80·0	107·0	56·4	89·3	60·6	109·7	46·4	51	4	124
	Northam	...	...	...	...	95·2	62·8	79·0	109·5	54·0	90·8	60·7	110·1	45·5	2	1	52
	York	29·995	29·956	30·195	29·685	94·3	62·3	78·3	109·0	55·5	91·0	60·6	115·6	45·8	2	1	45
	Guildford	...	...	...	...	92·1	63·4	77·8	104·2	58·4	88·7	60·7	112·0	42·0	1	1	61

The Climate of Western Australia during February, 1907—*continued.*

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						February, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
South-West and South Coast:	Perth Gardens	29·924	29·960	30·126	29·743	88·9	65·9	77·4	99·9	60·0	87·3	62·8	107·0	47·2	5	1	52
	Perth Observatory ...	29·936	29·966	30·135	29·795	87·5	64·8	76·2	101·0	59·0	84·7	63·1	106·8	47·7	6	1	48
	Fremantle	29·956	29·970	30·121	29·829	83·6	66·6	75·1	98·0	59·5	81·5	64·2	106·0	51·6	3	1	60
	Rottnest	29·944	29·949	30·141	29·811	80·6	66·3	73·4	94·0	60·0	78·4	64·8	109·0	56·2	*Nil*	...	65
	Mandurah	...	...	...	...	87·0	62·7	74·8	95·1	56·2	84·1	59·9	101·2	43·3	1	1	30
	Marradong	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Wandering	...	...	...	...	89·8	57·9	73·8	103·4	52·3	87·0	53·9	104·9	37·0	14	3	54
	Narrogin	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Collie	...	...	...	...	87·0	55·9	71·4	100·0	47·5	84·5	51·3	100·7	37·0	4	2	20
	Donnybrook	...	...	...	...	85·6	58·8	72·1	98·0	51·0	84·5	53·9	102·0	33·4	55	3	75
	Bunbury	29·980	29·999	30·220	29·803	84·6	60·2	72·4	90·6	52·4	82·2	58·3	101·5	41·3	2	1	25
	Busselton	...	...	...	...	82·9	58·1	70·5	90·0	51·0	80·9	53·8	95·8	41·4	39	3	56
	Cape Naturaliste ...	29·990		30·220	29·800	77·2	60·2	68·7	86·3	54·2	...	...	...	...	60	4	118
	Bridgetown	...	...	...	...	84·3	53·8	69·0	99·1	42·0	84·2	48·6	102·2	35·2	73	1	95
	Karridale	30·010	30·034	30·120	29·750	78·0	57·0	67·5	96·0	47·0	76·2	56·2	105·5	41·1	21	3	35
	Cape Leeuwin	29·990	30·002	30·170	29·750	76·0	63·0	69·9	94·0	60·0	73·5	62·1	103·8	54·8	86	7	106
	Katanning	29·976	29·986	30·271	29·722	86·1	57·2	71·6	107·1	48·0	84·6	54·7	109·0	37·9	32	2	82
	Mt. Barker	...	...	...	...	...	...	...	...	...	...	...	...	...	39	4	137
	Albany	30·038	30·038	30·301	29·798	76·1	59·4	67·8	94·0	49·5	72·9	57·4	94·4	41·1	29	4	135
	Breaksea...	30·030	30·032	30·310	29·790	71·3	61·7	66·5	82·8	55·2	69·6	59·9	81·5	50·0	23	7	117
	Esperance	30·002	30·024	30·264	29·682	83·0	62·4	72·7	107·2	53·0	77·5	60·0	109·8	41·3	14	2	104
	Balladonia	30·005	30·024	30·253	29·748	86·2	58·9	72·6	106·6	50·0	84·1	56·1	111·0	43·6	73	4	129
	Eyre	29·974	30·022	30·192	29·730	80·4	61·7	71·0	105·4	51·9	78·7	60·3	116·5	38·1	22	1	40
						INTERSTATE.											
	Perth	29·936	29·966	30·135	29·795	87·5	64·8	76·2	101·0	59·0	84·7	63·1	106·8	47·7	6	1	48
	Adelaide	...	29·979	...	..	..	..	.	.	.	86·2	62·0	113·6	47·4	...	...	...
	Melbourne	29·038	29·886	30·304	29·687	73·5	53·8	63·6	103·8	45·2	77·8	56·6	109·5	40·3	66	3	176
	Sydney	29·040	29·973	30·270	29·820	77·0	64·0	70·5	89·0	60·0	77·2	64·8	101·0	49·3	257	7	526

The Observatory, Perth, 6th March, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for January, 1907 (completed as far as possible), and for February, 1907 (principally from Telegraphic Reports).

Stations.	January, 1907.		February, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
East Kimberley:				
Wyndham	454	11	915	14
6-Mile	...	...	...	...
Carlton	...	...	...	...
Ivanhoe	...	...	...	...
Argyle Downs	...	...	...	...
Rosewood Downs	...	...	...	...
Lisadell	...	...	..	...
Turkey Creek	1090	13	1010	14
Ord River	..	...	...	...
Alice Downs	...	...	...	...
Flora Valley	...	...	...	...
Hall's Creek	895	10	369	9
Nicholson Plains	...	...	.	...
Ruby Plains	...	...	...	..
Denison Downs	...	...	...	...
West Kimberley:				
Mt. Barnett	...	..	...	...
Corvendine	...	...	...	...
Leopold Downs	...	...	...	...
Fitzroy Crossing (P.O.)	898	12	528	11
Fitzroy Station	...	...	...	...
Brooking	...	...	...	...
Cherrabun	...	...	..	. .
Bohemia Downs	...	...	...	...
Quanbun	...	...	..	...
Nookanbah	.	. .	.	.
Upper Liveringa	..	...	..	
Yeeda	1562	13	..	...
Derby	890	16	452	8
Pt. Torment	786	17	...	..
Obagama	1282	13	...	...
Beagle Bay	..	...	...	...
Roebuck Downs	926	12	...	...
Kimberley Downs	1117	11	...	..
Broome	1230	15	445	8
Thangoo	...	...	...	...
La Grange Bay	728	12	729	12
N.W. Coast:				
Wallal	1364	9	229	4
Pardoo	...	...	...	...
Condon	150	3	336	4
DeGrey River	...	...	...	...
Port Hedland	174	9	145	6
Boodarie	362	3	...	...
N.W. Coast—*contd.*				
Balla Balla	...	...	...	...
Whim Creek	233	8	395	8
Mallina	322	6	...	...
Croydon	375	5	...	...
Sherlock	...	...	...	...
Woodbrooke	464	5	...	...
Cooyapooya	311	6	...	...
Roebourne	425	6	94	2
Cossack	297	5	104	2
Fortescue	331	3	69	3
Mardie	134	4	...	...
Chinginarra	50	1	..	...
Yarraloola	264	4	...	...
Peedamullah	...	...	...	...
Onslow	Nil	...	46	3
Point Cloates	...	...	...	...
N.W. Inland:				
Warrawagine	...	...	...	...
Eel Creek	...	. .	...	...
Muccan	...	.	..	...
Ettrick		..	..	...
Strelly	338	7	...	...
Mulgie	.	...	...	...
Warralong	415	8	...	...
Coongon	368	7	...	...
Talga	413	9	..	...
Bamboo Creek	810	10	203	7
Moolyella	..	..	...	...
Marble Bar	235	8	219	8
Warrawoona	110	5	141	8
Corunna Downs	159	9	...	...
Mt. Edgar	222	9	...	...
Nullagine	83	7	104	4
Middle Creek	111	6	...	...
Mosquito Creek	...	..	...	...
Roy Hill	...	.	...	..
Bamboo Springs	...	..	..	...
Kerdiadary	130	3	...	...
Woodstock	80	4	...	...
Yandyarra	231	4	...	...
Station Peak	433	10	...	...
Mulga Downs	219	3	...	...
Mt. Florence	335	1	...	...
Tambrey	353	6	...	...
Millstream	335	7	...	...

RAINFALL—*continued*.

Stations.	January, 1907.		February, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. Inland—*contd.*				
Red Hill ...	...	...	...	...
Mt. Stewart ...	...	...	...	...
Peake Station ...	...	...	...	...
Nanutarra ...	...	..	...	...
Yanrey	191	6	.	. .
Wogoola ...	121	4	...	...
Towera	...	...	...	..
Gascoyne:				
Winning Pool ...	275	4	188	7
Coordalia ...	..	...	...	...
Wandagee ...	...	...	...	...
Williambury ...	121	3	...	...
Yanyeareddy ..	...	...	...	...
Maroonah ...	45	1	...	...
Ullawarra ...	Nil	...	...	...
Mt. Mortimer ...	...	...	...	...
Edmunds ...	. .	...	...	...
Gifford Creek ...	...	...	..	...
Bangemall ...	...	...	...	...
Mt. Augustus ...	...	...	.	..
Upper Clifton Downs	53	3	...	...
Clifton Downs ...	105	1	.	...
Mearerbundie ...	41	1	...	..
Byro	Nil	.	...	...
Meedo	..		...	...
Mungarra ...	..	...	...	...
Bintholya ..	.	.		
Lyon's River .	.	. .	. .	..
Mangaroon ...	..	..	...	...
Booloogooroo ...	100	3	...	...
Doorawarrah ...	158	1		...
Brick House ..	46	2	..	...
Boolathana ...	73	3	...	...
Carnarvon ...	8	1	Nil	...
Point Charles ...	24	2	...	...
Dirk Hartog ...	88	2	...	...
Sharks Bay ...	66	2	Nil	...
Wooramel ...	41	2	13	...
Hamelin Pool ...	20	1	28	3
Kararang ...	...	...	...	...
Tamala	..	...	...	...
Yalgoo District:				
Woolgorong ...	...	. .	...	...
New Forest ...	...	...	...	...
Yuin	...	...	...	...
Yalgoo District—*contd.*				
Pindathuna ...	65	1	...	...
Tallyrang ...	53	2	...	...
Mullewa ...	37	1	42	2
Kockatea ...	68	2	196	2
Barnong ...	100	1	...	...
Gullewa	126	1	28	1
Gullewa House...	105	1	84	2
Gabyon	61	1	...	...
Mellenbye ..	124	4	216	4
Woaragaminda...	75	2	...	...
Yalgoo	59	2	26	2
Wagga Wagga ..	25	1	105	5
Muralgarra ...		...	...	...
Burnerbinmah ...	Nil	. .	...	...
Nalbara ...	2	1	..	...
Wydgee	Nil	...	...	...
Field's Find ...	17	1	...	.
Thundelarra .	28	1	160	5
Rothesay ...	.	.	...	...
Ninghan ...	36	3	...	...
Condingnow ..	24	3	107	4
163-Mile ...	69	3	...	...
Palaga Rocks ...	. .	.	...	...
126-Mile ...	53	2	..	
90-Mile		...	...	...
Mt. Jackson ...	45	4	96	3
Murchison:				
Walo	17	1	. .	..
Yallalonga .		...	.	
Billabalong . .		...	...	...
Twin Peaks ...	247	2		...
Murgoo	104	2	15	1
Mt. Wittenoom ..	...	...	..	..
Meka	37	1	.	...
Wooleane ..	...	..	...	..
Boolardy ...	...	..	..	...
Yederah ...	...	...	.	...
Woogorong .	124	3	. .	..
Manfred . .	12	1	...	...
Yarra Yarra .	...	.	...	...
Milly Milly ..	28	2	...	...
Berringarra ...	Nil			..
Mileura	Nil	..		...
Mt. Gould ...	Nil	..	...	...
Moorarie ...	10	1	...	...
Peak Hill ...	Nil	.	67	7
Minderoo ...	Nil	..	..	...
Abbotts	20	2	125	2
Belele	...	...	...	...

RAINFALL—*continued.*

Stations.	January, 1907.		February, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
MURCHISON—*contd.*				
Gabanintha ...	23	1	62	4
Bungalow ...	40	1	..	...
Quinn's	...	. .	...	...
Nannine	Nil	...	167	3
Annean	Nil	...	36	4
Tuckanarra . .	25	1	...	...
Coodardy ...	Nil	. .	.	...
Cue	46	2	161	7
Day Dawn ...	33	2	72	3
Lake Austin ...	41	2	136	3
Lennonville ...	55	3	96	6
Mt. Magnet ...	11	2	131	3
Youeragabbie ...		.		
Murrum	Nil		.	.
Challa	9	1	.	.
Nunngara .	Nil	..	29	3
Berrigrin . .	35	1	..	
EAST MURCHISON·				
Gum Creek ...	Nil		.	.
Dural	Nil		..	
Wiluna	Nil		87	2
Mt. Sir Samuel ...	Nil	.	93	3
Lawlers	40	1	80	3
Granite Station	30	1		.
Wilson's Patch.	17	1	47	4
Poison Creek ...			.	.
Lake Darlôt ...	Nil		...	
Darda	.		.	
Salt Soak ...	3	1	..	.
Duketon ...	Nil			.
NORTH COOLGARDIE GOLDFIELDS:				
Laverton ...	Nil	...	115	4
Mt. Morgans ...	3	1	87	5
Murrin Murrin...	9	2	109	5
Mt. Malcolm ...	30	3	170	7
Mt. Leonora ...	6	1	208	4
Tampa		.	.	
Kookynie ...	25	2	90	5
Niagara	28	3	86	5
Yerilla	80	...	35	.
Yundamindera ..	26	2	212	6
Mt. Celia ...	24	2	...	...
Edjudina ...	...	..	...	
Quandinnie ...	...	...	.	...
Menzies	47	8	10	1
Mulline	43	8	104	4
Mulwarrie ...	81	8	91	2
Goongarrie ...	60	3	155	4
COOLGARDIE GOLDFIELDS:				
Waverley ...	...	...	111	3
Bardoc	41	3	209	4
Broad Arrow ...	40	4	87	3
Kanowna ...	14	3	67	4
Kurnalpi ...	22	3	100	4
Bulong	25	4	155	8
Kalgoorlie ...	18	2	49	4
Coolgardie ...	23	5	98	3
Burbanks ...	4	1	77	2
Bulla Bulling ..	23	3	...	...
Woolubar ...	Nil	...	...	...
Waterdale ...	Nil	..	27	5
Widgiemooltha ..	22	4	137	5
15-Mile Condensor	25	2	43	2
50-Mile . ..	12	1	...	...
Norseman ...	38	3	116	2
Lake View ...	85	4	...	...
Frazer Range ..	Nil	...	...	...
Southern Hills ..	.	...	...	...
YILGARN GOLDFIELDS:				
129-Mile ..	106	5	...	..
Emu Rocks ..	...	...	...	...
56-Mile	...	...	...	...
Glenelg Rocks ...	54	3	...	...
Burracoppin .	75	2	4	1
Bodallin ..	43	1	35	1
Parker's Road ...	.	...	...	...
Southern Cross ...	35	5	12	3
Parker's Range...	83	4	...	...
Yellowdine ...	82	3	82	1
Karalee	95	8	...	...
Kooraráwalyee ..	24	4	2	2
Boorabbin ...	49	3	31	4
Boondi	13	2	126	3
SOUTH-WEST (NORTHERN DIVISION):				
Murchison House	...	...	...	...
Mt. View ...	...	...	...	...
Mumby	Nil	...	34	1
Northampton ...	Nil	...	Nil	...
Chapman Experimental Farm	Nil	...	...	...
Narratarra ...	...	...	...	...

RAINFALL—*continued.*

STATIONS.	JANUARY, 1907.		FEBRUARY, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (NORTHERN DIVISION)—*contd.*				
Oakabella ...	...	...	...	...
White Peak ...	...	...	...	...
Geraldton ...	Nil	...	Nil	...
Hinton Farm ...	...	..	...	...
Tibradden ...	29	1	...	..
Myaree	38	1	...	...
Sand Springs ...	...	..	...	..
Nangetty ...	15	1	...	...
Greenough ...	3	1	Nil	...
Bokara	12	1	...	..
Dongara ...	Nil	...	Nil	.
Strawberry ...	69	1	145	3
Yaragadee ...	32	1	23	1
Urella	40	1		.
Opawa	16	1		...
Manara	40	.	58	2
Mingenew ...	26	2	16	3
Yandenooka ...	.	...	...	...
Arrino	Nil	...	450	1
Three Springs ...	..	..	51	1
Carnamah ...	147	3	28	3
Jun Jun	76	1	70	2
Watheroo ...	90	2	81	4
Nergaminon ...	75	1	88	4
Dandaragan ...	54	3	Nil	...
Yatheroo ...	46	1	...	..
Moora	50	1	11	2
Walebing ...	73	5	51	4
Round Hill ...	106	3	26	2
New Norcia ...	51	4	46	3
Wongon Hills ..	35	5	131	3
Wannamel ...	59	3	Nil	..
Gingin	41	3	39	2
SOUTH-WEST (METROPOLITAN):				
Wanneroo ...	52	2	...	...
Belvoir	49	3	..	...
Wandu	62	6	1	1
Mundaring ...	67	4	Nil	...
Canning Waterworks	41	3	Nil	...
Kalbyamba ...	41	3	2	1
Guildford ...	60	4	1	1
Perth Gardens ...	47	5	5	1
Perth Observatory	42	6	6	1
Highgate Hill ...	38	3	...	...
Subiaco	42	5	2	1
Claremont ...	...	...	...	...
SOUTH-WEST (METROPOLITAN)—*cont.*				
Fremantle ...	57	6	3	1
Rottnest	65	5	Nil	...
Rockingham ...	65	4	Nil	...
Jandakot ...	39	3	Nil	...
Armadale ...	...	...	...	...
Mundijong ...	71	4	12	1
Jarrahdale ...	65	5	Nil	...
Jarrahdale (Norie)	65	5	2	2
Serpentine ...	70	6	5	1
EXTREME SOUTH-WEST:				
Mandurah ...	29	4	1	1
Pinjarra (Blythewood)	39	3	5	1
Pinjarra ...	42	3	4	2
Upper Murray ...	35	5	..	..
Yarloop	47	5	.	...
Harvey	21	4	Nil	...
Brunswick ...	...	...	...	...
Collie	16	4	4	2
Glen Mervyn ...	Nil	...	..	..
Donnybrook ...	20	2	55	3
Boyanup ...	Nil	..	59	2
Bunbury ...	23	3	2	1
Elgin	27	3	50	4
Busselton ...	17	2	39	3
Quindalup ...	18	2	..	...
Cape Naturaliste	58	4	60	4
Glen Lossie ...	20	2		.
Karridale ...	14	4	21	3
Cape Leeuwin ...	20	7	86	7
Lower Blackwood	56	8	...	...
Ferndale ...	16	2	63	1
Greenbushes ...	16	8	80	1
Cooeearup ..	31	2	..	...
Bridgetown ..	22	4	73	1
Hilton	...	...	69	1
Greenfields ...	18	1	...	...
Dunninup ...	27	2	...	..
Cundinup ...	12	2	..	...
Wilgarrup ..	21	6	..	...
Balbarrup ...	Nil	...	93	2
Bidellia ...	11	1	...	...
Westbourne ...	53	3	..	...
Deeside	15	1	34	2
Riverside ..	9	2	...	...
Mordalup ...	44	8	...	...
Lake Muir ...	14	1	...	...

RAINFALL—*continued.*

Stations.	January, 1907.		February, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Eastern Agricultural Districts:				
Walgo	40	2	23	2
Emungin	...	...	...	...
Dowerin	21	24	...	...
Warramuggin	...	...	..	...
Oak Hill	...	...	. .	...
Baker's Hill	42	4	Nil	...
Monglin	..	..	..	.
Hatherley	19	1	60	3
Momberkine	20	1	..	...
Bolgart	...	...	..	...
Eumalga	59	3	26	1
Newcastle	12	1	Nil	...
Craiglands	46	3	...	...
Eadine	...	..	...	...
Northam	50	4	2	1
Grass Valley	..	...	10	1
Cobham	29	3	4	1
York	43	3	2	1
Burrayocking	19	3	. .	...
Meckering	19	3	13	1
Cunderdin	..	...	..	...
Doongin	..	...	...	...
Whitehaven	...	...	...	...
Mt. Caroline	20	3	17	1
Cutenning	...	...	...	...
Kellerberrin	26	4	5	1
Cardonia	35	2	...	...
Baandee	163	3	20	2
Nangeenan	52	4	4	1
Merredin	61	2	10	1
Codg-Codgen	20	2	18	2
Noongarin	...	...	...	...
Mangowine	29	5	...	...
Yarragin	...	...	.	...
Wattoning	Nil	...	...	..
Koomberkyne	26	6	118	5
Great Southern Railway Line:				
Dalebridge	27	5	...	...
Beverley	83	4	Nil	...
Brookton	68	3	...	...
Sunning Hill	110	5	37	2
Pingelly	64	4	30	3
Yornaning	39	4	72	3
Narrogin	42	4	65	2
Rose Hill	35	1	...	...
Wagin	15	3	80	2
Katanning	50	4	32	2
Sunnyside	112	7	64	2
Great Southern Railway Line—*contd.*				
Broomehill	86	4	47	1
Woodyarrup	48	4	97	2
Pallinup	54	1	99	2
Tambellup	135	3	...	...
Toolbrunup	10	2	41	2
Cranbrook	...	...	...	...
Stirling View	66	5	72	5
Kendenup	77	5	54	3
Woogenellup	73	4	...	...
Wattle Hill	.	..	...	...
St. Werburgh's	94	6	34	5
Mt. Barker	98	6	39	4
West of Great Southern Railway Line:				
Talbot House	26	4	. .	..
Jelcobine	41	2	18	2
Bannister	...		..	...
Wandering	41	5	14	3
Glen Ern	107	4	...	...
Marradong	25	4	8	1
Wonnaminta	...	...	...	...
Williams	59	4	24	1
Rifle Downs	...	...	...	...
Darkan	.	...	...	...
Arthur River	42	4	19	1
Gainsborough	24	1	...	...
Glenorchy	10	1	...	...
Kojonup	40	1	45	1
Blackwattle	...	...	. .	...
Warriup	122	6	52	4
Forest Hill	118	5	60	6
East of Great Southern Railway Line:				
Sunset Hills	...	...	...	...
Oakdale	45	3	10	1
Barrington	81	5	...	...
Bally Bally	...	...	...	...
Stock Hill	89	4	61	1
Qualin	...	...	...	...
Woodgreen	41	4	...	...
Glenallan	82	3	25	1
Gillimanning	...	...	...	...

RAINFALL—*continued.*

STATIONS.	JANUARY, 1907.		FEBRUARY. 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of Points. 100 = 1in.	No. of wet days.
EAST OF GREAT SOUTHERN RAILWAY LINE—*contd*				
Wickepin ..			...	...
Crooked Pool ...	39	3	65	2
Nallyring ...	34	4	...	.
Yardup	22	4	101	5
Bunking ...	30	2	...	...
Bullock Hills ...		.	.	..
Dyliabing ...	19	3	126	2
Glencove ...	36	3	111	2
Cherillalup ...	13	2	...	...
Mianelup ...	55	6	...	..
Woolganup ...	61	6	.	...
Chillinup ...	...	...	.	...
Jarramongup ...	.	...	...	...
Uberin	30	4		...
SOUTH COAST:				
Wilson's Inlet ...	54	6	29	6
Grasmere ...	73	9	26	3
King River ...	61	3	...	...
Albany	106	6	29	4
Point King ...	102	4	..	...
Breaksea ...	94	12	23	7
Cape Riche ...	...	...	...	...
SOUTH COAST—*contd.*				
Peppermint Grove	38	5	..	.
Bremer Bay ...	48	8	30	4
Coconarup ...	49	7	33	3
Ravensthorpe ...	51	7	40	5
Cowjanup ...	...	...	...	...
Hopetoun ...	10	4	37	5
Fanny's Cove ...	88	2	...	...
Park Farm ...	85	3	.	
Grass Patch ...	70	3	...	
Swan Lagoon ...	80	4	..	
30-Mile	96	4	.	...
Gibson's Soak ...	149	6	.	...
Myrup	104	5	.	.
Esperance ..	90	8	14	2
Boyatup	..	..	...	...
Lynburn ...	116	4		
Cape Arid ...	147	8	.	.
Point Malcolm ...	47	4	18	2
Israelite Bay ...	43	7	21	4
Nannambinia	60	6	..	
Balbinia	66	7		..
Balladonia ...	56	6	73	4
Eyre ..	18	4	22	1
Mundrabella ...	...	...	...	...
Eucla	32	4	1	1

The Observatory, Perth,
6th March, 1907.

W. E. COOKE,
Government Astronomer.

By Authority: FRED. WM. SIMPSON, Government Printer, Perth.

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EDITOR'S NOTES.

Stock and Machinery for Sale.—Elsewhere in this issue will be found a lengthy list of valuable stock and machinery for sale, by the Government, from the experimental farms at the Chapman and Narrogin.

Scale Parasites.—In a letter written by E. M. Ehrhorn, Deputy State Commissioner of Horticulture of California, to Mr. Compere, under date of March 4th, 1907, he says:—With reference to the recent importation of red and purple scale parasites into that State from Asia, that they are doing well ; that large colonies have been liberated of the original importation, and that they now have begun to reproduce themselves in that State. Western Australia will be supplied with colonies from California at an early date.

Suffolk Pigs.—Some considerable interest is being shown in England over the new breed of pigs known as "Suffolks." They are white pigs with short heads, long bodies, and thin hair. They are very prolific, and although not very well known outside of the British Isles, they have become great favourites wherever kept. They produce a good quality of pork at an early age. They are easy keepers, but are not especially good for grazing, because of the shortness of their limbs, and a tendency to lay on large quantities of fat.

Strawberry Cultivation.—A report made recently by Mr. Whittington one of the orchard inspectors, on the partial failure of the strawberry crop at Kalamunda, has just been received from Mr. Mann, the Government Analyst, to whom samples of soil had been submitted in connection with the report. The subject matter is of much interest, and Mr. Mann's report should prove of great value to those interested. Unfortunately, it came to hand too late to be published this issue, but will appear in the May number of the *Journal*.

Fallowing.—Evidence of the value of summer fallowing and deep cultivation before the autumn rains is continually being brought under the notice of the public. In our latest exchanges we note that the system is being adopted right through the Transvaal. Hundreds of thousands of acres in that country, that up to quite recently were lying idle, are now made to yield heavy crops. Given good soil and a ten-inch rainfall, there should be no reason why profitable crops cannot be produced. In this issue, under the heading of "District Notes," instances are given where this system has been tried in the Pingelly district with marked success.

Farming in Argentine.—Taking the land and its products, the true sources of all the Argentine Republic's wealth, first, it is stated in the *Buenos Ayres Standard*, in its review of 1906, that the cultivated area has been increased since the end of the year (the seed-time of most crops), 1905 by some 170 per cent., which increase is represented by 20,687,898 acres. The area devoted to wheat is slightly greater than previously, as is also that given to maize; that given to linseed is less, which has been decreasing since 1903, while lucerne now covers nearly 7,500,000 acres, its great upward shoot having been made since the discovery, some five years ago, that some kinds of this plant would thrive on the salty, sandy lands towards the west, which had before been considered as practically barren.

Diseased Tomatoes.—A correspondent, writing from Kanowna, asks for the reason why tomatoes crack. The specimens received were submitted to Mr. L. J. Newman for microscopical examination, who states:—"I have examined the tomatoes submitted and find that they have been attacked by a fungus disease, the cause, in my opinion, being due to excessive moisture, causing the fruit to swell too rapidly and to crack, thereby giving access to the fungus spores." If the tomatoes had been kept well watered from the first there is no doubt that the trouble would not have occurred. It is the absence of sufficient moisture and then a sudden application, such as a good shower or extra watering, that causes the trouble. Apples and other fruit have been known to go the same way.

Livestock Returns.—The increase in the livestock of the United States during the last quarter of a century is very remarkable. According to the statistics collected by the Department of Agriculture there were in 1880 11,201,800 horses, and there are this year 18,718,578 horses; in 1880 there were 1,729,500 mules, and this year 3,404,361 mules. Of cattle there were in 1880 12,027,000 milch cows and 21,231,000 other cattle; in 1906 there were 19,793,866 milch cows and 47,067,656 other cattle. Sheep on the whole have increased in less degree. There were over 43,500,000 in 1881, and over 50,500,000 in 1906; but this year's return compares unfavourably with the highest on record, which is that of the year 1903, when there were 63,964,876 sheep in the United States. Swine on farms in 1880 numbered over 34,000,000, this year over 52,000,000, about a quarter of a million fewer than there were in the record year for swine—1892.

Sheep Culling.—Farmers who are, by virtue of profits always earned, turning their attention to the improvement and development of their sheep, have long since learned that bare bellies are the first to be culled, the reason being that such a failing represents so much idle space and wasted capital. It appears that there is another reason for wishing to develop wool on that part of the sheep's anatomy, for wool is the best protecting pad there can be against a damp, cold soil. Sheep which have been developed in wet districts are found to be better covered underneath than are those which for some generations have existed on dry soils. A well-covered belly is more important to the well-being of the sheep itself than a well-woolled forehead. Wool about the face is a doubtful advantage, especially when the grass-seeds and clover burrs begin to show up, and though the belly wool picks up these and all other trifles, the mischief gets no further. With face wool there is always the risk of the eyesight suffering.

West Australian Butter.—The following interesting letter was forwarded to the Hon. the Minister for Agriculture by Messrs. Camerer Bros., of "Lichtenthal," a portion of the re-purchased Bolgart estate, near Newcastle, who received it from their agents, Messrs. Dyer and Hollet, to whom they have been sending the produce of their dairy:—"Having handled your factory-made butter for the last three months, during the hottest part of the year, we have pleasure in reporting that we are perfectly satisfied with it. During that period it has always arrived in a solid condition, even on the hottest days, which fact speaks in the highest terms of praise of your thorough knowledge of the art of butter-making. We have a growing demand for the butter, and regret we cannot get larger supplies. The offer we made when you first brought the butter in to take up to 100lbs. per week at the enhanced price we now confirm. In fact, so well pleased are we that we are prepared to take up to 500lbs. per week, and hope the time will soon come when we may be supplied with that quantity." It is worthy of notice that the butter referred to is conveyed by road, summer or winter, over a distance of fully thirty miles, and is delivered in Northam in a condition that ensures getting top price in the market.

———

Feeding Experiments with Pigs.—The following instructive remarks on the subject of pig-feeding are taken from the evidence of the managing director of the Wiltshire Bacon Curing Company, given before the Agricultural Committee of the Tariff Commission, New Zealand:—"From 1896 to 1900 a long series of experiments on pig-feeding was carried out under the auspices of the Wilts County Council, and it was then ascertained that the best results were attained by the use of barley meal combined with dairy produce, while the use of maize was found to be most undesirable, except where sparingly used in conjunction with other foods. Pigs fatted on maize are worth from 20s. to 30s. per cwt. less than those fatted on barley meal. Were we dependent on pigs fed on maize meal, the industry of bacon-curing would practically cease to exist, as in the face of the present competition nothing but the very best quality of bacon would have the best chance of surviving. So great is the difference in the value of pigs fed on maize compared with those fed on barley, that it would never pay the feeders to rear pigs on maize in preference to barley."

Preserving Lemons.—Lemons may be preserved for almost any length of time if they are carefully packed, and stored in a chamber where the temperature does not exceed 45 degrees. In connection with the preservation of all kinds of fruit a process has been invented by a Melbourne resident. The method has been inquired into by Mr. J. Knight, the Victorian Government fruit expert, and he has reported favourably on it. He states that it is much simpler than any method yet adopted, and that it can be applied by any orchardist at small cost. When once established it requires no further expense in working, as nature's laws maintain the conditions of air suitable for the fruit contained in the chamber. The system consists of charging the air with moisture by passing it through openings in the wall, which are covered with an absorbent fabric that draws up the water from a small trough, which is made of ordinary spouting, stopped at each end. Passing through the moistened fabric the air is cooled from 48 to 50 degrees, which is sufficient to prevent any absorption from the fruit. Mr. Knight has no hesitation in saying that this homely, simple and effective method of preserving fruit will be a great boon to orchardists.

Arresting Decay in Fruit.—Ripe fruit rots because of the growth of fungus spores on its skin into the body of the fruit. These fungi grow in most easily through any minute cut or bruised spot. If most of the spores on the skin of the fruit are killed, the fruit will not rot so soon. Commercial solution of formalin was mixed with about thirty times as much water and the fruit dipped into it for ten minutes. Bananas thus treated and exposed to the air remained sound for ten days longer than untreated bananas. If oranges were treated in this way and then wrapped in paper, it seems probable that the access of fresh spores to them would be prevented and they might last longer still. This treatment was proved in the case of apples completely to stop rotting which had just commenced. It is highly recommended as one means of preserving in a sound state tropical fruits during their transit to temperate countries. On a larger scale 10 gallons of water and 3 pints of formalin are put in a cask, and the fruit, in a sack of netting, is lowered in for ten minutes, and then set aside to drain. The solution does not deteriorate, but may be used again and again until it is practically all gone. Experiments have been conducted for some time past on the above lines at Kew, and published in the *Journal* of the Board of Agriculture. The idea is not a new one, yet it deserves the attention of our fruit-growers, who are recommended to experiment.

Dry Farming.—Every mail brings additional evidence as to the value of "Dry Farming." A writer in an exchange states:—"I find in growing turnips and mangolds on my land I am late in the season before I can get them fed off. Last year it was well on in November before the mangolds were finished; this year it was November 1st when the sheep finished the turnips (Fosterton's Hybrid). This is too late for a crop in most seasons, even with irrigation; so the past two seasons I have tried dry farming.

The scarifying, to lift the roots loosens the top soil a little, but the soil is generally trodden firm by the sheep and pigs, and with the dry weather gets very hard. I plough with a disc plough 1½ to 2 inches deep, this kills all weeds that have come up. After the next rain I plough again, getting down another inch or two. The two ploughings make it easy to harrow, and it will then hold all the moisture that falls. I plough a third time in February or March and put the seed in after the first good rain. If there are average autumn rains, the grass gets a good start, and will grow all the winter, and make good feed for the ewes and lambs in August and September, when most needed, and the ewes keep in good health. Mine were fed last year on this to the end of September. I threshed last year sixty bushels to the acre, and I expect to thresh as much this season if the weather keeps favourable. Of course by this style of working I lose a crop, but I reckon I make more off one good crop than two bad ones, and have more pleasure in the working.

Green Manure for Potatoes.—Potatoes, in order to be placed in a position to thrive in their growth, should be planted in soil which has been brought into a good state of tilth. Above the tubers it should be in a fine porous condition so that the tender shoots find no obstacle in penetrating upwards. Below the tubers it should be permeable so that the fibres of the roots can penetrate downwards in search of nourishment and moisture. An interesting experiment was made last season to test the comparative action of farmyard manure and a growth of lupins ploughed under as a green manure. On a field of uniform character about twenty-four acres in extent, a crop of lupins was grown and ploughed under, while on an adjoining twelve acres a dressing of farmyard manure at the rate of 15 tons to the acre was given. The produce obtained was respectively:—From the green-manured field, nine tons per acre; from the farmyard-manured field, six tons per acre. In order to investigate the case for this great difference in the production, the soil in parts of the two fields was opened so that the root-systems of the tubers could be examined. It was then perceived that the roots of the tubers grown in the farmyard manure had not been able to penetrate more than 16 inches, while the roots of the tubers grown after lupins had followed the interstices left in the soil by the deep-growing roots of the lupins, and had penetrated to a depth of more than a yard, thus finding the moisture necessary for the development of the plant.

Cool Storage of Fruit.—More than ordinary interest has this season been bestowed by fruit growers to the cool storage of fruit. An invitation made some time ago by this Department to agricultural societies to send to the Government Refrigerating Works lots of half-a-dozen cases of fruit, free of charge, for keeping in cool stores as long as the fruit will stand, and also to private growers to store at a reduced charge of 1d. per case a week trial lots of fruit up to 10 cases each, has been largely responded to. Some interesting results are being recorded. Several growers have already expressed their intention of availing themselves next season, and in a larger measure, of this mode of keeping good fruit, confronted with a glutted market, until such time as an enhanced price, when out of season, will offer a chance of reaping a larger profit. Since the last issue of the *Journal* a case of remarkably fine apricots from Mr. Dunn's orchard at the Porongorups, near Mt. Barker, was examined after eight weeks' cool storage. These apricots which were above the average were supplied by Mr. Dunn at the suggestion of Mr. Despeissis while on a visit to that part of the country during the Christmas holidays. Some of the fruit weighed five ounces each and three weighed a pound, others weighing four ounces and three ounces. They are of a deep orange colour, heart-shape, and have a very firm flesh, with a flat stone. The tree, which is a seedling, should be worth propagating, at least for that part of the State which is noted for the quality of its fruit.

Ploughing for Sheep.—The system of ploughing the land and cropping for the purpose of supplying feed for sheep is coming more and more into favour every year. It is found that the natural grasses, although very abundant in some districts in the spring and early summer, do not last, owing to the moisture giving out and the feed dying off. By ploughing, deep cultivation and the resultant conservation of moisture, abundance of wholesome feed may be obtained for months after all natural grasses have ceased to grow and be of value as food for stock. With the continued increasing demand for lambs for cold storage and export, farmers will do well to work out the cost and advantages of rapidly fattening lambs with the assistance of grown crops, as against the haphazard conditions that exist in many instances in leaving them to feed on the natural herbage. After all it is a matter of £ s. d. If, by the expenditure of, say, £50, a hundred acres can be cropped, that would supply sufficient feed to top up say 300 lambs that would fetch 10s. apiece, then the proposition is a sound one and one worthy of consideration and adoption. Elsewhere in this issue is an account of experiments being carried out in the cultivation of grasses on jarrah country by Mr. G. Paterson, of Pinjarra, who is a firm believer in cropping for sheep. Mr. G. Barrett-Lennard, of the Swan, is another who is going in extensively for the same thing, and when we see such men following any given system, it may be taken for granted that it is a sound one and worthy of emulation. For with these gentlemen who have made farming a success it is not a matter of chance or luck, but the thinking out of details and carefully applying the experience gained by years of hard work and close study. The thanks of settlers and others are due to such men for the opportunity given to follow a scheme that has been proved by their efforts to be a sure, safe, and profitable one. This autumn we trust to see many thousands of acres turned over by the plough for the cultivation of roots and green feed to be sent to market in the shape of fat lambs.

Antidote for Poisoned Sheep.—The Under Secretary for Agriculture has received the following letter from Mr. Henning, of Yalup Brook, in the South-Western Districts, giving an interesting experience of saving a valuable ram who had eaten poison. The letter is as follows:—"Some months ago I obtained from your Department Mr. Mann's antidote to the poison plant. Until a few weeks ago I had no opportunity of using it. On 7th February last I found a Leicester ram poisoned; he was down, paralysed, bleeding from the nose, eyes glazed, ears cold—in fact, the only warmth was under the brisket and flank. I ascertained from a neighbour that the ram had been in that condition for about an hour. It took me three-quarters of an hour to procure the antidote, and then, at 10.15 a.m., I administered one lozenge in a pint of water. At 11.15 I gave him a half-dose in a pint of water. Great improvement resulted, although the limbs were still rigid, breathing stertorous, with an inclination to bloat. At 12.15 the breathing had improved, the general appearance was better, body warm, but the belly very hard. At 1.15 the breathing was about normal, otherwise the condition was the same. At 3.30 the condition was the same, but bloat coming on. At 5 I drenched him with oil, his bowels moved, but blood only was passed. At 7 p.m. breathing was very hard, bloat set in, used the trocar, and after the gases had escaped injected to paunch ammonia. Next day, 8th February, at 6 a.m., ram was much easier, but still paralysed. At 10 a.m. I gave him half a dose. At 1 p.m. used trocar again with liquid ammonia injection. At 6 p.m. great improvement, still paralysed. 9th February, 6 a.m., gave a whole dose of antidote; great improvement throughout day. On 10th, at 8 a.m., ram was able to stand but not move about. Put him in sling. Administered a drench of gruel (milk and oatmeal). At mid-day and again at night On the 11th the same treatment, which was continued to 14th. The ram was thoroughly recovered and turned out into flock."

Feeding Value of Beet Pulp.—The following testimony of the value of beet pulp to stock-breeders is given in the "American Agriculturist":—"Dairymen and stock-feeders generally in sections close to beet sugar factories have within recent years fully learned the merits of feeding beet pulp. The experiment stations have made thorough investigation, proving the economy and value to the farmer in utilising this food, and the practical experience of large numbers of farmers fully bear out the facts. Lambs made as good gains on pulp as on corn at the Colorado station, and beet pulp fed with grain to hogs has been proved a most excellent ration. Practical farmers testify that when beet pulp is fed, there is an economical saving of hay, and at the same time the pulp has the most beneficial effect on the milk yield. One successful farmer writes:—'Most of the cows were decreasing in milk flow at the time pulp feeding began, after which there was an increase.' The important thing for farmers away from the beet sugar territory is the fact that dried beet pulp can now be readily secured and fed. The use of dried beet pulp is highly commendable, because in addition to its food value it is a great aid to digestion and assimilation. Successful farmers in Germany, Norway, and Denmark have long since found this out, and up-to-date dairymen at home are availing themselves of this splendid feed. Cows find it very palatable, and in a way means June pasture the year around, forming as it does, a natural vegetable food, having just the right properties to meet the needs of cows or other animals. From the very highest authority the statement comes that a pound of dried beet pulp forms a better feed for the dairy cow that a pound of corn. These strong statements can be tested, and to your satisfaction, through trying this valuable food product."

Milk for Calves.—A calf's stomach is like a cheese vat of milk after the rennet is added. The rennet taken from a calf's stomach coagulates the milk in the cheese vat the same as it coagulates the milk in the calf's stomach. Every cheese-maker knows that rennet will not act upon cold milk in his cheese vat, neither will it act upon the cold milk in the calf's stomach, until the calf has warmed that milk to a proper temperature. Cold milk causes the calf to shiver, deranges his digestive machinery, and renders him unable to make a thorough assimilation of his food and seriously impairs his future usefulness as a feeder. He usually turns out a pot-bellied, bristly-coated runt, when if a little warm milk could have been put in his milk before feeding he might have turned out a fat, sleek-coated fellow, a satisfaction and a profit to its owner.

Low Price of Wheat.—The collapse of the wheat market, for that is practically what half-a-crown a bushel means, says "Bucolic" in the *Morning Herald,* is undoubtedly a present evil, but not an unmitigated one. In it is the germ of good farming; in high wheat values is found almost irresistible inducements to bad farming. Australian farmers, and for that matter, other farmers of new land have ever been slow to grasp the fact that it is almost impossible to maintain fertility and farm prosperously without the assistance of stock. Force has always been required to bring them to that knowledge, and the form the force has usually taken has been the falling of prices for chaff and grain below adequately payable ones. As has been demonstrated, wheat at 2s. 6d. per bushel will not permit of permanently profitable farming, and farmers must either grow something more remunerative than wheat or secure better values for the grain. The latter option is the more feasible, and the solution lies in stock. Cattle, sheep, pigs, or poultry, any of these will return far more than current market values for wheat and the farm losses in fertility will be enormously reduced. It is difficult to say which of these two facts is of greatest importance to farmers; one is immediate, the other later in its consequences, but the future is not to be sacrificed to the present. Just now it is needful that a wave in favour of stock-keeping on farms sweep over our wheat-growing area. It is no experimental scheme for the amelioration of the condition of farmers; it is the proven and recognised step in agricultural development. It invariably happens that sooner or later the supply of first products overtakes the profitable demand, and there is no use howling when what was inevitable comes to pass. Then farmers are forced to produce secondary products, which means a bettering of farm systems, and a bettering of farm systems means, sooner or later, improving the condition of the farmers themselves, for which surely no howling should be heard. It is quite certain that if land were limited and wheat and chaff remained at high prices, it would be found necessary in a few decades to import these fertility-destroying products from countries where their low values compelled better farming. So let us not be depressed by what is called agricultural depression, for it is no such thing; it is agricultural progression. We have progressed so far that the old order changeth, and new methods are required. It may be that the easiest stages are behind; let us be thankful that we had any easy stages. In this State we are merely following in the footsteps of farmers of older lands, and the way is charted out by their experiences. The consumer says we have all the wheat we can pay you a profitable price for, but there are lots of other things we can buy from you at good profit to you; produce them! The consumers' law is final.

DAIRYING.

By R. E. Weir, M.R.C.V.S.

From ancient Biblical history down to the present day, dairying, that is the production of milk, butter, and cheese, has formed one of the chief branches of agriculture, and has done more in the matter of enhancing the value of land, besides having proved times out of number the means of placing the farmer earlier in an independent pecuniary position than any other branch of agronomy. In the past the industry has been chiefly confined to the older and more settled parts of the world, but of late years the various British possessions including Australia are strenuously endeavouring to meet the continuously increasing demand which exists for the manufactured article (particularly butter). This has proved so indispensible to man, and particularly Britishers, that owing to the ever-changing conditions which are taking place in the more congested centres of population—especially noticeable in Great Britain—where in each year the home production lessens. For this reason supplies have to be obtained from outside sources, and in the past Denmark has had practically the monopoly in this direction, its present export being about 239,000 tons annually. Realising the great benefits which would accrue by securing a portion of this trade, New Zealand and the better populated States of the Commonwealth, particularly Victoria and New South Wales, initiated the factory system, and by means of advances paid by the Government in the form of bonuses on all butter exported the industry in those parts is now on a permanently sound footing; the past twelve months being 29,000 tons. This you will notice is a mere trifle in comparison with the quantity exported from Denmark, yet indirectly it has been the means of materially benefiting the States which have initiated the trade, and their future prospects are still brighter. The question now arises, what has Western Australia done to improve her position in this direction. I regret to state that she has been a complete laggard in the past, yet there are growing signs that she is awakening from her lethargy, and will soon make amends for past neglect. The State has undoubtedly had many difficulties to contend against in initiating a trade of this kind. The course nature of the indigenous herbage on the majority of our lands and the lack of lime salts, particularly phosphates, has occasioned much loss amongst dairy stock and discouraged many who would otherwise have been large producers before now. Climatic and labour conditions have also been drawbacks in this direction, but with improved methods of farming, which the Government are doing all in their power to demonstrate, and by laying down of succulent grasses, growing green fodder for summer use, and labour-saving appliances, as demonstrated by the use of separators and milking machines, all tend to solve the problem of butter manufacture and give the farmers another avenue to advantageously operate and secure good returns from the land. We have a large area of pastoral land running South from Perth, which, when improved, is highly suitable for dairying. Your own lands also, although not so favoured as the more Southern portions, can be made suitable for the propagation of this industry. Its light nature and natural lack of phosphates cannot be more effectively improved than by stall-feeding dairy cattle, and applying the manure which results from this process to the land, thus giving it a body which materially adds to its productiveness and grazing value. Irrigation methods can also be easily introduced, and the more favoured portions utilised for the growing of fodder and the manufacture of ensilage. There is absolutely no reason why the industry cannot be carried on with success. Being assured on this point, the next consideration is the method of placing the industry, on a proper working basis. As many of you are doubtless aware, the Government some years ago assisted in the establishment of a small factory at Busselton, but owing to the irregularities in milk supplies it had to be closed down, and has only recently been started again. The premises have been leased to the well-known firm of Macfarlane and Co., who are utilising it in conjunction with their Perth factory, where some two tons of butter is being manufactured weekly. Although these depôts with a present capacity of over a ton per day are available to producers, where they can send their supplies of cream, it is essential that the Government should to an extent stimulate the industry by the provision of cool storage vans on the railways, and by reducing the cost of transit to the lowest possible minimum. By this means, a helping hand would be given to an industry which would continue to flourish, and ultimately prove an invaluable asset to the State. The present day method of dairying is both simple and quite a contrast to the old conditions. By the use of a separator, costing from, say, £8 to £30, according to the size, and which every dairyman requires, the cream is separated immediately after milking, and when cooled down to the lowest possible point, and given an occasional stirring to ensure its keeping sweet, can be sent to the nearest market. In cool weather the cream requires sending to the factory every third day, and every second day during the heat of the summer. The skimmed milk can be fed to calves and pigs, and thus profits made which have been obtained from what is really another source. Respecting the class of cattle which has proved the most profitable for dairying purposes, there are several good strains of milking cows, but it is dfficult for me to say which is the best. It has often been found that a crossbred animal yields the greatest quantity of milk, but for many reasons it is usually advisable to secure a pure strain. The milking Shorthorn, Ayrshire, and Holsteins may be given the palm of place for milking; but before selecting it is advisable for the farmer to consider the conditions under which his stock have to exist, as should the land be exposed or of poor quality other breeds may be found more advantageous. Having selected the herd, and assuredly given every care with regard to feeding, the next step is to test (which may be done by means of the Babcock tester) the milking capabilities of each individual cow. This can be done in a very few minutes, and if records are kept the unprofitable cows can easily be weeded out and better returns obtained from a smaller number. By this means, and the systematic infusion of blood from well-known milking strains in the matter of the judicious selection of bulls, a degree of perfection will be secured, which will prove of incalculable benefit to the owner. Better results will also be obtained from a smaller holding well grassed than from larger ones with spare pastures. It is essential also that the farm should be divided into a number of small paddocks for the better preservation of the feed, and the stock can then be regularly changed from one paddock to the other. By following a system such as this, profits from dairying alone equal to about £8 per cow should be obtained annually, not mentioning incidental returns from bye-resources.

STOCK DISEASES.

REPORTS ON ABATTOIR.

By F. CLUTTERBUCK.

These reports, which bear on questions of considerable public interest, are of especial value to stock owners. Their publication in this *Journal* is due to the courtesy of Dr. Cleland, Pathologist and Bacteriologist, and by permission of the Public Health Department.

In view of the fact that the Nor'-West cattle season is now approaching, and that the time for receiving shipments of these cattle for slaughter at Robb's Jetty is at hand, I thought, perhaps, a brief summary of our work of inspection at the Abattoirs for the past six months, so far as it concerns myself, would be of some assistance to you in the work of tabulation.

Dealing with the cattle trade itself as it affects this State, and more particularly Robb's Jetty, it is apparent that for practically six months of the year the beef supplies are drawn exclusively from the Nor'-West. During the remaining six (summer) months they are drawn from local sources where they are fattened and then forwarded to the Metropolitan area. Small supplies also arrive periodically from the Eastern States, but so few come within the scope of my inspection that I have refrained from commenting upon them. My fellow inspectors may be better able to do so.

It is about the general and pathological condition of the locally-fattened, or may be, bred and fattened cattle, etc., which have formed the meat supplies of the State for the past six months that I now wish to report.

Taken on the whole, the general condition of the meat of locally-bred and fattened cattle has been excellent.

In dealing with their pathological condition, I may mention, in a general way, that although several animals slaughtered were affected with tuberculosis in a local or a chronic form, not one arrived at the abattoirs in a generalised condition. At Yatheroo, Yandanooka, and Yardarino, where some of these cattle were fattened, the owner, in one instance, informed me that these particular animals were Nor'-West (Kimberley) bred, and were purchased as store cattle for fattening. This circumstance is worthy of note, and opens up a vista of probabilities which point to the risk of placing upon healthy cattle stations store cattle from a country where tuberculosis is known to be rampant.

Actinomycosis of the head and tongue is fairly common in locally-fattened cattle, more so than at first appears to be the case. It is surprising what a large number of animals are infected immediately under the mucous membrane of the tongue, some of them in so slight a degree as to be almost unobservable; still, there is an infection. This disease is not peculiar to any particular district, and is apparently pretty generally distributed.

Hydatids is not common in local cattle, and is of course peculiar to only those districts where the station dogs harbour the tape-worm (*Taenia Echinococcus*). Cows, no doubt because of their age, are infested to a greater extent than bullocks, but none of the local animals are nearly so badly infested as those imported from the Eastern States. The invasion of this parasite has had little or no effect upon the general condition of the carcases.

Chronic Abscesses are common to all local cattle. The principal organs affected are the lungs and livers, frequently involving the muscular tissue of the diaphragm contiguous to the livers. The cause of this affection is probably due to the hard thorny nature of some of the grasses.

Not one case of *pneumonia* came under my notice, which speaks well for the healthy conditions of the animals' natural surroundings.

Sporadic lesions, due to the worm (*Strongylus Micrurus*), occurred in the lungs of many of the cattle slaughtered, from local districts.

Emphysema (inflation) more particularly of the adipose tissue surrounding the kidneys, the sub-cutaneous, and the inter-muscular tissues of otherwise healthy carcases has been noted. I have been asked by various cattle owners, as well as those connected with the abattoirs, to account for this apparently abnormal condition. Investigations and close observations of all cattle arriving at the abattoirs from a considerable distance have led me to conclude that this form of *emphysema* is caused by or is the result of rapid waste of the body tissues. Your opinion upon the matter may help us to arrive at a definite solution.

Sheep.

Respecting sheep, supplies of which were received from nearly all the local districts as well as the Nor'-West, their general condition was, generally speaking, very good.

Pathologically, all of them were more or less infected with the parasite (*Cysticercus Tenuicollis*), especially so the lambs and young sheep. From certain districts, such as Northampton and Wagin, the sheep were also infected with hydatids, but not to any alarming extent. The worms, *Strongylus rufescens* and *filaria* were fairly common in the lungs of many of them. A consignment of old ewes arrived at the abattoirs from the Midland district, which were chronically affected with large consolidated areas in the lungs, probably due to the *Strongylus rufescens* (parasitic pneumonia).

Supplies of sheep from the Eastern States arrived periodically; the majority were in excellent condition.

In those arriving from Victoria the fluke parasite had invaded the livers to such an extent as to render that organ, in some instances, extremely cirrhotic (fibrous). In one lot of these sheep I detected a triple infection by parasites, viz., Fluke, *Cysticercus Tenuicollis,* and *Strongylus rufescens* the latter being so well pronounced as to enable me to extract the ova and embryos, as well as the parasite, from the lungs. The South Australian sheep were infected principally with hydatids, the fluke-worm only occurring sporadically.

Pigs.

Taken on the whole they were a very moderate lot, their general condition, in some instances, being such as to suspect a total lack of the knowledge of orthodox breeding and feeding. Pathologically a large number were affected with tuberculosis of the sub-maxillary glands; some were affected with pneumonic areas in the lungs (chronic), and a great many with hydatids in the lungs and livers. One large boar in particular had the liver and lungs absolutely swarming with them. From the infected organs of this carcase I was able to obtain splendid microscopic specimens of the scolices and hooklets of the (immature) *Taenia Echinococcus.*

Inflammatory patches caused by an invasion of the *Strongylus paradoxus* were observed in the lungs of some of the pigs.

P.S.—Since writing this report I have to inform you that the first shipment of Nor'-West (Kimberley) cattle arrived at Robb's Jetty on Wednesday night, with a loss of about 75 animals on the voyage. This mortality being exceedingly high, I suspected one of two diseases as the cause of it; either, tick-fever or contagious pleuro-pneumonia. So far my conjectures have proved correct. On Good Friday I discovered three cases of pleuro-pneumonia, one in the advanced and two in the initial stages, undoubted evidence of its permeation through the herd. I would have liked you to have been present to see the typical and progressive characteristics of this deadly disease. The condition of the carcases so far show no departure from the normal. Tuberculosis is very much present. There is no tick-fever.

REPORT BY CHARLES A. MATTERS.

Sir,—I desire to bring under your notice several ways in which the work of meat inspection at the Fremantle Abattoirs might be made of greater value to the State from a stock-breeding point of view. A pure food supply is one of the most important problems in public health affairs at the present time, and as one of the largest sources of supply is the stock-raising industry, I think that anything that ensures a supply of healthy stock for food purposes will have done something towards solving that problem.

I would like also to draw your attention towards the investigations made by prominent scientists in other parts of the world, for the purpose of preventing the spread of disease from stock of one district to stock of another district.

I have divided this paper into three parts for the purpose of making clear my opinions on this subject.

Part I. deals with the means by which disease is spread from district to district in this State.

Part II. with the measures which are adopted in other countries to prevent the spread of disease from district to district.

Part III. with the uses that could be made of the information provided by our meat inspector's pathological slips for preventing the spread of disease in this State.

PART I.—*The means by which disease is spread from district to district in this State.*

In this State of Western Australia a sufficient and healthy supply of stock for human consumption has been, in the past 10 years, mainly dependent upon supplies received from the Eastern States. The stock-breeders of this State are just overtaking the local market, and in the course of time, there is every hope of a large export trade in frozen meat being established. To do this, it is necessary that we should have many small settlers engaged in mixed farming. Now in this State of Western Australia, stock for breeding purposes are very valuable, and in the case of a small settler it makes a big hole in his capital. It can thus be seen that if, just as he is getting a nice little herd together, a disease breaks out among them and either kills or renders them unthrifty, a serious check has been put upon him, and indirectly upon the development of the State.

Comparing this State with most other countries, however, we find that we have few diseases that the stock-breeder has to fear, therefore the sooner we take steps to stamp out the diseases we have got, and to prevent fresh ones entering the country, the sooner the industry and the State will prosper.

Within the borders of this State we have a number of diseases that are confined to certain districts, and so far as we know, they are of a nature which renders them impossible of 'being transmitted to another district. There are also a class of diseases capable of spreading everywhere where stock are depastured, and only wants an opportunity to make havoc amongst the herds of this country. It is the latter class that I intend to deal with in this part The diseases of importance known in this State that are capable of spreading over all parts are:—(1) Tuberculosis, (2) Actinomycosis, (3) Pleuro-pneumonia, (4) Hydatids, (5) Swine fever. I will take them in the order set down, and describe the most common method by which they are spread.

Tuberculosis.—This disease affects nearly all species of animals, and is the commonest, as well as one of the worst that breeders of cattle and pigs have to contend with. The commonest method by which the disease finds its way into a herd is by medium of another animal from a herd that has the disease in some of its members. It is unusual to find a breeder who takes the trouble to find out whether the herd from which he buys an animal is healthy. As a rule he generally needs them for either breeding or fattening purposes, and as the majority of stock-breeders never keep an animal once it is in a condition for the market, therefore they are not concerned whether it is healthy or not, so long as it will fatten to a degree sufficient to enable them to sell it again. They never think that all the time a diseased animal is in their paddocks it may be dropping the germs everywhere it goes, with the result that any healthy cattle in the same paddock with them are almost sure to contract the disease at some time or other. With dairy cows the risk is much greater, owing to the insanitary conditions under which the cows have to live, and also the possibilities of a man milking a cow that has the disease and then milking or handling another healthy one. A case that came under my personal observation at Fremantle Abattoirs last year gives a good idea of the risk breeders are running by buying stock from diseased herds. The particulars of this case are as follows, and can be accepted as typical of many other cases:—A small pastoralist in the Leonora district had for some years been breeding a few bullocks and bringing them down to Fremantle when in a prime condition. About 12 months ago last September he purchased a number of North-West store bullocks, expecting to fatten them quickly and thus get a quicker return for his money than he would by breeding. Now, these bullocks were a portion of a mob that was badly affected by tuberculosis, but the buyer was completely ignorant of this fact. He took them up to his run and turned them straight in with his other cattle. A few weeks afterwards he noticed that several of them had very bad coughs, and some of his own breeding also had developed coughs, and that in spite of the good feed very few of the new ones appeared to have improved since he brought them up. Some time after he mustered his cattle and found that several of the new ones, and one or two of his own cattle had died. In addition a large number of his own breeding appeared to be losing flesh instead of gaining. Anyhow, he missed bringing down any of the new stock the following season excepting some of his own breed, and concluded to give the new ones an extra twelve months to fatten. Needless to say, they went from bad to worse, and seeing that his own cattle were getting as bad, to save further loss he brought them down to Fremantle. Inspection after slaughter revealed the fact that almost every animal had tuberculosis in a more or less severe stage; the North-West cattle mostly showing old lesions, and the cattle bred by the owner showing comparatively early lesions. He was quite unaware that they were diseased, and until he was told could not make out the reason for their condition. After I had explained to him what the trouble was, he vowed that he would not deal with North-West cattle again.

Actinomycosis (Lumpy Jaw, etc.)—This disease, although not nearly as deadly as tuberculosis, is, nevertheless, very harmful to cattle, affecting as it does the various parts and organs upon which the animals depend for the proper preparation of their food, and the nourishment of the body. It is spread in the same way as tuberculosis, and causes considerable loss to the grower and the butcher. In certain districts of this State actinomycosis is very common, and whenever an animal gets a wound it gives an easy entrance to the germs.

Pleuro-pneumonia.—Pleuro-pneumonia is a highly contagious disease affecting cattle, and has caused immense losses among herds in different parts of the world, and also in the North-Western districts of this State. It is possible for the infection to travel by means of fodder or other material contaminated by diseased cattle, but, as in most other diseases, it is generally conveyed from one district or herd to another district or herd by means of an infected animal.

Hydatids.—In using the word hydatid I do not wish to discriminate between the *cysticercus tenuicollis* and the *echinococcus,* as they both have the dog for a medium by which the diseases are spread, and both have just as important an effect on an animal. Although these two diseases are rarely suspected of causing the death of animals, yet they are the means of causing acute peritonitis and pleurisy, as well as other complaints from which animals often die. In the spread of hydatids the dog plays the principal part, for it is in the intestines of the dog that the tape-worms live and it is from their eggs that we get the hydatid cysts. To illustrate the method by which hydatids are spread, it will be necessary to describe the life history of the hydatid in an elementary style. In the first instance, we have the tape-worm in the intestines of the dog. The tape-worm lays its eggs, and they are passed out with other excreta when the dog is defæcating, and in all probability they are washed into the drinking water or else remain attached to blades of grass. Stock drink water in which these eggs are, or eating the grass to which they may be attached, swallow the eggs with the water or food. They thus gain an entrance to the body of their host and are there hatched and form cysts wherever they lodge in the body.

Swine Fever.—As the name suggests, swine fever is a disease which affects swine alone. This disease was introduced into this State from the Eastern States four or five years ago, and in this short time has done immense damage to the pig-raising industry. It is a good argument in favour of taking every precaution necessary to prevent other diseases at present unknown here from entering this State. To show the value of a strict watch being kept on all pigs entering this State from the East, I will give an instance that occurred last year. A certain firm imported about 100 pigs for breeding purposes, intending to distribute them amongst different breeders in the country districts. The inspector when he inspected them before landing, found that some had symptoms suspicious of swine fever, and they were put into quarantine for three weeks. It was fortunate that this was done as swine fever broke out amongst them, and before they were released a majority of them had died, or been destroyed on showing symptoms of the disease. Had they been allowed to depart as soon as landed, they would have carried the disease far and wide, causing such an epidemic that in places the industry would have been stamped out. It may be of interest to note that they were supposed to have undergone three weeks quarantine before they were shipped, and were accompanied by a certificate from a Government inspector to the effect that they were free from disease when shipped. The usual manner in which the disease is spread is the same as in most of the other diseases here, namely, by breeders and others buying pigs from affected herds, and without taking any precaution to discover whether they are healthy or not, letting them mix with other herds that are healthy. In a case that I met with last year this was the cause of an outbreak that startled the firm that suffered and made them more cautious with newly bought pigs. The circumstances of the case were as follows:—A certain firm bought some pigs at an auction sale near Perth. An inspector who happened to be at the sale knew that they were from a herd not long since affected with swine fever, and therefore warned the buyer. However, he refused to listen to the inspector's warning and trusting to his knowledge of pigs bought them. The manager of the butchering business had them placed in one of a row of sties at their piggery, and noticing that some of them did not appear well, he had two or three killed a couple of days afterwards. I inspected them, and found that one at least was in the last stages of swine fever. Needless to say, I immediately communicated my discovery to the manager, and advised him to kill all the new ones at once, and to isolate all the pigs in the sties next to them, from the rest of the piggery. He would not believe that it was swine fever, and refusing to accept my advice he left them in the same sties. About six weeks afterwards over two-thirds of the total number of pigs that were in the piggery were dead, and to save further loss he had all the remainder killed.

I have now dealt with the most important diseases capable of being transmitted from district to district in this State, and although there are many ways by which disease may be spread, I think that if due attention is given to the health of the stock when buying, stock-owners will have got rid of the most important method by which disease can get into their herds.

The ways by which foreign diseases gain an entrance and footing in the State do not come within the scope of the meat inspectors' work. The diseases special to a district being, as far as we know, unable to spread beyond that district are also outside the scope of this paper.

The question of how diseases are spread between district and district is one that requires a vast amount of work to deal with thoroughly, and of a necessity I have been unable to devote my space to more than a rough survey of the most common methods by which cattle, sheep, and swine are affected by the diseases peculiar to either of these species or common to all.

PART II.—*The measures adopted in other countries to prevent the spread of disease.*

Of late years there has been much public interest aroused by the statements of prominent scientists that bovine tuberculosis is capable of being transmitted to mankind, and the result has been that all over the world investigations have been made for the purpose of finding some means by which tuberculosis in cattle and swine might be stamped out, or prevented from spreading. Most of these investigators have come to the conclusion that the best method discovered up to the present is that which embodies the tuberculin test for the diagnosis of the disease. They recommend that all animals reacting to the test should be isolated from the healthy ones, and in the case of stock bought by breeders for breeding purposes, they advise that the test should be applied, and only those animals that fail to react should be purchased. Dr. Salmon, late Chief of the Bureau of Animal Industry of U.S.A., states that after a careful study of literature on the subject of the tuberculin test, and his own experiences, his conclusions are—(1) That the test is remarkably accurate, and if an animal reacts it is certainly affected; (2) that the usual dose has no effect upon healthy animals; (3) that if it has any effect at all, it slightly increases their power to resist infection by tuberculosis. It is owing to the fact that tuberculosis is so difficult to diagnose in its earlier stages by the ordinary methods that the value of tuberculin is due, and in many cases, animals that would not be suspected of having the disease, react to the test when applied. and when killed are found to be affected. The older countries are so satisfied as to the value of this test for tuberculosis that they refuse admittance to any cattle (except those intended for immediate slaughter) unless accompanied by a certificate from a State official, that the tuberculin test has been applied and the cattle have failed to react. In Denmark. Professor Bang has elaborated a scheme for stamping out tuberculosis amongst the dairy herds of that country. The main features of the scheme are the application of the tuberculin test, and the complete isolation of all cattle reacting to the test. Professor Bang states that although 50 per cent. of the dairy cattle in Denmark are affected with tuberculosis, yet 22 per cent. of the herds are completely free from the disease, and owing to the vigorous efforts being made by Government officials and private owners, the number of affected herds are decreasing rapidly. From this statement by such an eminent authority, it is easy to be seen that although over half of the total number of cattle are diseased, and 88 per cent. of the herds are affected, yet by the use of tuberculin and the isolation of all animals reacting to it, it is possible to gradually get rid of the disease. If this is so in a country that is simply rotten with tuberculosis, how much easier it would be in this State where, according to the statistics compiled from the meat inspectors' reports, the percentage of tubercular cattle is given at about 9 per cent. of the total number slaughtered. For the prevention of the spread of pleuro-pneumonia, most European and American States rely on an examination by a competent stock inspector, together with a period of quarantine in a special quarantine area. In most of these countries a set of stringent regulations have been made and enforced for the purpose of preventing the spread of pleuro-pneumonia from one district to another. In England so great was the havoc caused by this disease, and so great is the fear of another outbreak, that the "Contagious Diseases of Stock Act" provides for the immediate slaughter of all animals in a herd, if any of them are found to be suffering from pleuro-pneumonia. The Act also imposes a very heavy penalty on anyone removing stock from a diseased herd, to another herd. To introduce cattle from a country where pleuro-pneumonia is raging, into England, a special certificate is required from a State veterinarian of the country where they are shipped, to the effect that the cattle were healthy when shipped. The cattle have also to undergo another inspection before being landed, and are then placed in quarantine for a certain period before they are allowed to proceed to their destination.

Swine fever has caused great losses to pig-breeders in England and America, and has been combated by similar means to those adopted for dealing with pleuro-pneumonia. The "Contagious Diseases of Stock Act" of England forbids the utilisation of the flesh of affected pigs for food, and orders that the carcases of pigs affected, or suspected of being affected, at the time of their death be destroyed. The Act also forbids the removal of pigs from an affected district to another district, and in the event of an outbreak in a herd, all pigs in that herd are ordered to be immediately destroyed, and their carcases burnt. In America the interstate inspection is very stringent, and the regulations for the prevention of the spread of swine fever are strictly enforced. Similar precautions are also adopted in the European countries where swine fever is likely to be introduced.

There has been practically nothing done in other countries to prevent the spread of actinomycosis or hydatids, excepting the destruction of animals showing signs of actinomycosis and the condemnation and destruction of all organs or parts of carcases showing lesions of actinomycosis or hydatids.

The methods of dealing with the contagious diseases, such as pleuro-pneumonia and swine fever, are typical of the methods adopted for the prevention of the spread of the many other contagious diseases known in older countries, but not known in this State. They are all based on the idea that if a State can prevent a disease from being introduced from one district or country to another, it will be possible to stamp out the disease where it has made its appearance.

PART III.—*The uses to which meat inspection could be put for the prevention of the spread of disease in this State.*

The meat inspection service in this State deals solely with slaughtered stock intended for human consumption, and has nothing to do with live stock, this work coming under the Stock Department. The powers of a meat inspector are conferred on him by the provisions of the "Public Health Act," which states that he may seize and condemn any carcase or portion of carcase of any animal that is unfit for human consumption. Dealing with animals after they have been slaughtered, therefore enables him to get a correct idea as to the diseases and their extent present in a herd of cattle, swine, or flock of sheep. This information is sent to the Central Board of Health in the weekly report of the inspector, and in addition, a pathological slip containing information as to the disease and its extent, district the animals come from, and much other useful information is made out for each animal showing a diseased condition. These slips are sent to the Government Bacteriologist and Pathologist, and any interesting specimens of disease are also sent to him for the purpose of examination. The information contained in these slips is tabulated under the different diseases and districts, and there is thus a record kept of the diseases and their extent known in every district of the State. Up to the present time no attempt has been made to make use of this information for the benefit of stock owners, and it is my desire to show ways by which it could be made of some use.

In dealing with the methods by which disease is spread in this State. I have shown that by far the most important method is the introduction of diseased stock into a healthy herd. It can be stated with confidence that the majority of stock owners would not if they knew it buy diseased animals, and thus allow these animals to affect the rest of their herds. But as most men know, who have had any experience with stock, it is a most difficult matter to sell when an animal is suffering from a contagious disease. It is then necessary to find some means by which the man who intends buying stock can make sure that he is buying healthy animals. It would also be very useful for a stock owner to know what diseases are present in his stock, for until he knows what disease is among his animals he cannot be expected to take steps to stamp it out.

Now, it is this information or part of it that the meat inspectors can supply, and I hope that all stock owners will take advantage of the opportunity to get reliable information regarding the diseases that affect stock in this State. To enable them to do so, I advise that this information should be prepared once a month, together with the names of the particular farms or stations where an outbreak of any contagious diseases has occurred. This information could then be published in the *Agricultural Journal*, and thus all the stock owners would be in a position to guard against the danger of buying stock from these particular places. It would also be advisable to send a letter of advice to the owners of stock that have been found to be diseased when killed, notifying them of the fact, together with particulars of the diseases, and where possible, advice as to the means they could adopt to get rid of the disease, might also be tendered.

KEROSENE REMEDY AND THE FRUIT FLY.

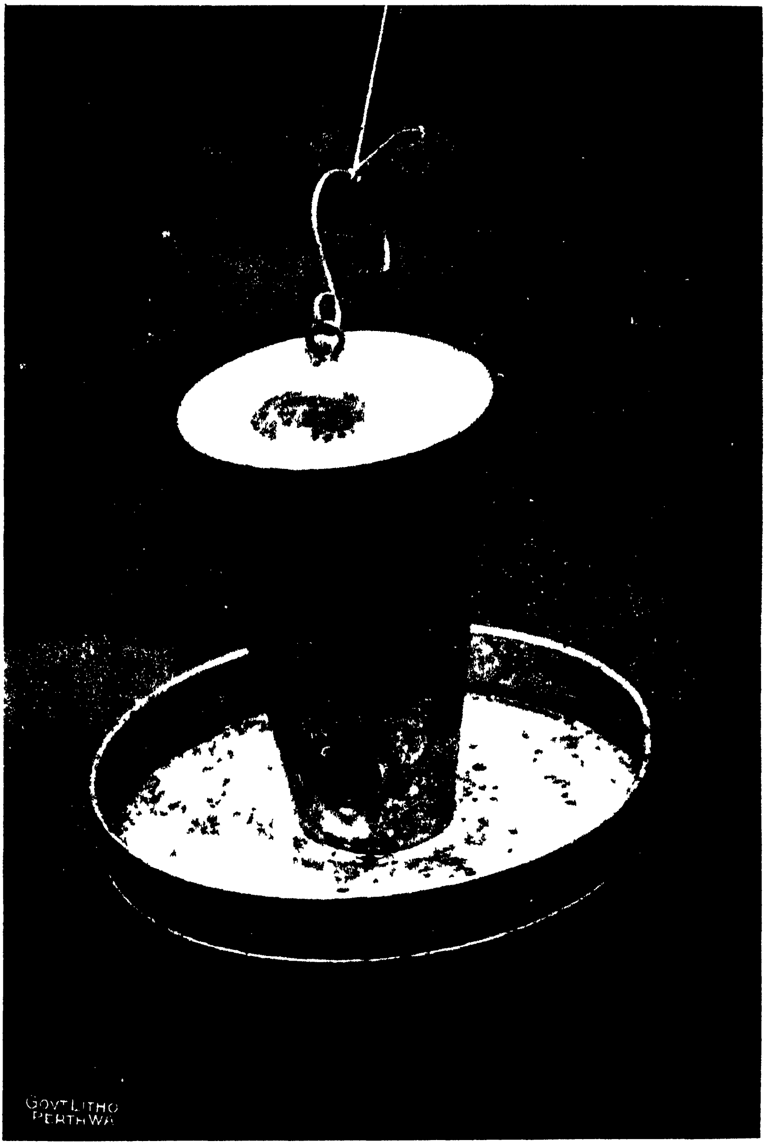
(*Ceratitis Capitata.*)

By Geo Compere, Entomologist.

Since this fly has become such a destructive fruit pest in various parts of the world, many methods of controlling it have been suggested and tried against various species of fruit flies in various countries. In Mexico determined effort was made by the Government to exterminate the Orange Fly (*Trypeta ludens*), or bring it down below the danger line. During the fruit season a large force of labourers was constantly employed hand-picking and gathering infested fruits, and burning them. A poisonous bait was also prepared by Professor Rangel to destroy the adult flies. This bait was a sweetened poisonous fluid, which was sprayed upon the trees to be protected; many flies were killed by this method. By thoroughly carrying out the above warfare against the orange fly a great amount of fruit was saved, but the cost was equivalent to the value of fruit saved. The work was done at Government expense and under its supervision, and the following season the flies, according to the latest reports, appeared as numerous as ever.

The poison used in the above experiment was a poisoned bait made from an extract of a Mexican plant (*Haplophyton cimicidum*) sweetened with sugar.

In South Africa a great deal of constant attention has been given to the poisoning of the fruit fly (*Ceratitis capitata*) the same species as we have here. The mixture giving the best results there in the destruction of the adult flies was one pound of arsenate of lead, eighteen pounds of treacle, and twenty-five gallons of water, sprayed on the trees to be protected. Covering the trees with a light cotton netting has also been extensively used there, and also the constant destruction of fallen fruits. Mr. T. F. Dreyer, assistant entomologist, in an article under the head of "Poisoned bait for fruit flies," published in the *Agricultural Journal* of the Cape of Good Hope February number 1907, says in part—"Despite the serious losses which it inflicts on fruit growers, and the consequent con-



Self-feeding kerosene fountain for the capture of Fruit-fly

stant attention of economic entomologists, is still one of the pests which can be controlled only to a very slight extent."

In Italy, Professor Berlese has obtained some very satisfactory results by using a poisoned mixture against the Olive fly (*Dacus oleae*). The mixture used by Professor Berelese is made up of 31 per cent. of honey, 65 per cent. molasses, glycerine 2 per cent. arsenite of potash 2 per cent., used at the rate of ten parts of the mixture to ninety of water. In the use of poisoned bait against the fruit flies, many other insects, such as bees and beneficial insects are also destroyed.

In 1904 Mr. Despeissis, in conjunction with inspectors Hooper, Wickens, and Whittington, made some experiments in this State with poison bait against the fruit fly (*Ceratitis capitata*), and Mr. Despeissis, in recording his observations which were published in this Journal in July 1904, calls attention to the fact that in poisoning the fruit fly they also destroy the friendly insects.

Recently Mr. Devenish of Guildford discovered the fact that pure kerosene oil, when placed in an orchard or garden where the fruit fly (*Ceratitis capitata*) existed would be attracted to the kerosene, and by placing a shallow vessel containing some kerosene in amongst the branches of the trees, the flies would be destroyed by hundreds. Mr. H. E. B. Gull, also of Guildford, carried out, simultaneously with Mr. Devenish, promising experiments with kerosene. That kerosene oil should attract this particular species of fly is a very remarkable circumstance.

Since my return to the State, in company with Mr. Newman we made some experiments with the kerosene in some close by gardens, with a view to ascertain if the flies were in reality attracted by the kerosene oil, or if their getting into it was purely accidental. Our experiments showed that there is nothing accidental in connection with their getting into the oil, but showed most clearly that the kerosene really attracted the flies. A vessel containing some kerosene was placed in the forks of a tree about 18 inches above the ground, and at a point where ordinarily specimens of the flies are never noticed. Within 15 minutes after having placed the vessel in the position above mentioned, dozens of the flies could be noticed moving about the trunk of the tree making their way to the oil, and 18 hours later Mr. Newman removed and counted 124 fruit flies from the one vessel. Female flies removed from the oil showed upon examination to be fertile, being yet full of eggs. I consider that the discovery of the fact that kerosene attracts and kills the adult flies, one of the most remarkable ones made of recent years in connection with insect life, and one that is of the greatest importance to the fruit-growing interest of this State. It is a very simple and inexpensive remedy by which the adult flies can be destroyed, and within the reach of everyone, and will not destroy bees or beneficial insects.

This simple method of destroying adult flies need not cause us to slacken our efforts to secure and introduce the true parasite of the fruit fly. The one helps the other. The true parasite which is a diminutive-winged insect only attacks the maggots and kills them, whereas the kerosene attracts and kills adult flies.

GRASSES ON JARRAH LAND.

By G. Chitty Baker.

One is continually hearing it said that our jarrah lands are no good, that nothing of any account will grow on land that has been occupied by jarrah, and that you cannot run twenty sheep to the hundred acres. Statements such as these are devoid of the truth, and are calculated to do harm to the State and retard settlement.

Fortunately we have those amongst us who are not given to the believing of such stories, but instead they have faith in the productiveness of all and every kind of soil in the State. Amongst this class, Mr. George Pryde Paterson, who owns and works part of the large estate he was born on at Pinjarra, stands out with much prominence.

Last year Mr. Paterson commenced to clear a portion of apparently poor jarrah land on his property, consisting of sandy soil over a clay subsoil, which had been covered with very big timber and thick scrub. (A view of a portion not yet touched is shown in plate 1.) The burning off was completed and ploughing commenced early in October last. On the 11th of the month a part of this was harrowed and sown with *paspalum dilatatum*, rolled and left to itself. From that time up to the middle of last month, when I paid a visit to Mr. Paterson, practically no rain had fallen, yet, notwithstanding this, the grass had made splendid growth. In places where it had managed to send its roots down through the loose top soil into the more retentive subsoil a really remarkably fine growth had been made. A quantity of couch grass seed had been sown at the same time with equally gratifying results. There is every indication that the coming spring will show a paddock of good grass that will be permanent.

Another portion of this clearing was ploughed in the end of October, and sown with amber cane on the 3rd of November, *i.e.*, a month later than the grass, and after the time when any more rain could be expected, yet a fine growth resulted, as may be seen by plate 2. Owing to the roughness of the ground it is really wonderful that the plants grew at all. It is the intention of Mr. Paterson to plough this portion again before the winter sets in, and by one or two thorough cultivations, to bring the soil into good tilth, when it is expected that really good crops will be the result.

The settlers generally have good reason to thank such men as Mr. Paterson for giving them the opportunity of studying such valuable object lessons. There is no doubt that the natural sequence of the above experiments will be the cultivation of many acres that are at present considered almost valueless.

There is yet another phase of the question that has not been touched upon, but to which too much notice cannot be given, and that is the actual value of ploughing and sowing the land for grazing purposes. So far as this State is concerned very little has been done in this direction; but

PLATE I —Jarrah country portion of Mr G P Paterson's property at Pinjarra, now being put under grass

from what can be learned from one visit, it is evident that it is likely to prove a valuable proposition, and that Mr. Paterson has struck the key-note of success as regards sheep-raising. In any case the thanks of the community will be due to him for his courage in thus putting his ideas into actual practice, and we will wait for the collecting of data and watch with interest the subsequent results.

Not contented with the above experiments, the owner of Creaton has, at a considerable outlay, installed a very efficient pumping plant for the purpose of irrigation. Unfortunately the river, which is the source of the water supply, can only be used during the early part of the summer, by reason of the water becoming too salt as the season advances. If a dam were built it would mean that property having a river frontage of over 24 miles could use the water, thus kept fresh, all through the summer; the benefits from which can hardly be realised. The pumping plant laid down by Mr. Paterson consists of a 6 h.p. engine, working a centrifugal pump capable of raising thirty thousand gallons of water per hour, and to irrigate a distance of seven hundred chains from the river bank.

Mr. Paterson has valuable assistance from his sons, both of whom evince a keen interest in all matters appertaining to the farm. Not the least of the important work taken on by Mr. Paterson is the keeping a diary of all experimental work. It is to this gentleman that we are indebted for much valuable data. He is also an enthusiast in experimental grass growing, having laid out and sown seventeen plots with different grasses, the results of the various growths of which he has promised to supply us with for publication in a later issue.

The illustrations accompanying this article are from photos. taken on my visit last month, and illustrate:—In plate I., the uncleared portion of the ground upon which the experiments are being made; plate II., the crop of amber cane growing on the cleared ground; and plate III., a general view of the amber cane, with the virgin bush in the back-ground.

TOP DRESSING BUSH AND GRASS LAND AT SERPENTINE.

It having been reported to the Department that Mr. A. R. Richârdson, of the Serpentine, had attained considerable success in promoting the growth of leguminous plants, and, in particular, of hardy trefoil, on his homestead, by the use of phosphatic fertilisers applied as a top dressing to the soil, a request was made to Mr. Richardson that he would kindly favour the Department of Agriculture with an account of his experiences on the subject. In reply, Mr. Richardson writes:—

"In reply to yours of 1st March, 1907, I have pleasure in informing you that I have had, as you appear to have heard, good results from a top-dressing of Thomas' phosphate (basic slag) on grass paddocks, the soil being loamy river flats deposit; and also encouraging results from top-dressing of less fertile upland, red gum, black-boy, rather cold kind of soil—sort of mixture of clay and sandy grit—rather wet in winter and bakes up hard in summer, and in its natural state not producing much but very coarse rushy kind of feed and underground black-boys. The rainfall in both cases is ample in winter—about 30 inches; but like most of our Western Australian climate has rather a long dry summer of some six months. In the first case—the river flats—the paddock was old cultivated land, that grew fair crops, and also, if left uncultivated, a fairly thick growth of grasses—trefoil, native silver grass, couch grass, dandelion, and other weeds and grasses, and which we frequently shut off from the live stock about 1st of August, and then early in November or end of October get a cutting of meadow hay with the mowing machine set low; but at the same time there is a good proportion of it, where growth is not sufficiently luxuriant, to allow of cutting a hay crop, and even on the richer parts the trefoil (or native clover), which we highly value for self-sown hay, would appear to run out or grow so thinly that the yield would frequently be only from 6 cwt. to 10 cwt to the acre, and my object in experimenting with top-dressing was to see if the growth could be increased and thickened so as to return a heavier yield for the mowing machine.

"In my first experiment—as I was determined to merely broadcast the phosphates on the ground in the month of June and let the rains wash it down, without either harrowing or scarifying—I allowed a liberal dressing of over 3 cwt. to the acre, and which the Job's comforters amongst my experienced hands (and who are seldom absent if you forsake the old paths or venture to break away form old traditions) assured me was a pure waste of good material, and could have no effect if not ploughed in. However, as one of the unbelievers had the pleasure in the spring of steering the mowing machine through the tangle mass of trefoil about 18 inches high (so long as it could not stand up), and had many times to get off the machine to clear the track for the next round—he had his revenge on himself, and on some portions of the field, I do not say on all, we had a return of about two tons of meadow grass hay to the acre. The following year I treated different parts of the paddock with 2 cwt. to the acre and was half afraid the heavy yield from the first year's dressing would perhaps leave the land somewhat exhausted after the heavy stimulant of season before; but though (without further dressing) the yield was not quite so heavy, yet it was much heavier than before it was treated with the Thomas' phosphate.

"Last season I tried five separate experiments with top-dressing, viz., Thomas' phosphate, sulphate of potash, bone dust, nitrate of soda, and superphosphate, and though it was difficult to say positively which was the best, yet I think Thomas' phosphate, the superphosphate, and the nitrates gave the best, and sulphate of potash the least; we know the bone dust is good but somewhat slower in action, but its effects more lasting.

"My experiment No. 2, with the Thomas' phosphate on the natural unploughed, uncleared red gum land was very apparent in its effect, and though only broadcasted on the surface, I do not think I am exaggerating if I declare the result as converting land that in its natural condition (trees had been rung and killed some years before) would only carry one sheep to three acres, and then only keep them as growing wool and not meat, would, after the treatment, carry a sheep to 1½ acres and give them better grass.

"In these matters every district and every locality has to ascertain for itself which kind of fertilizer best suits the conditions of soil, rainfall, etc. In some districts they tell me Thomas' phosphate has little result, but down here in this part of the South-West between Perth and Pinjarrah, and between Perth and Bunbury, it certainly causes a strong growth of both crops of leguminous plants, clovers, etc."

DISTRICT NOTES.

PINGELLY.

The following notes have been contributed by Mr. E. S. Hancock:—

MR. F. SNOW'S FARM.

Fallowed v. Unfallowed Land.

This gentleman's farm is seven miles East of Pingelly, and has been in occupation for some 30 years.

Last year 180 acres were cropped, of this 70 was fallow land, portion of which yielded an average of four bags per acre, and 10 over, whilst the unfallowed land only gave three bags and nine over.

Fifty acres of hay were cut off the fallowed land for an average of 30 cwt. per acre, as compared with 22 cwt. off unfallowed land.

Oats yielded 26 bushels, and Mr. Snow is enthusiastic over the splendid feed provided by oaten stubble to that of wheat. One bushel of seed per acre was used and 56lbs. of Thomas' phosphate, except on 10 acres of fallow, where stable manure was used.

MR. DEWAR (COWCOWING).

Mr. Dewar farms a property just four miles East of Pingelly, better known as Clarke's, and close to the townsite of Mourambine. This is a fine property taken up many years ago. This season 350 acres were cropped, 226 being stripped for wheat, 24 acres oats, and 100 cut for hay; of the total 210 was fallow land. The portion cut for hay was all fallow land, and the stalk topped 6ft. in height giving a yield of 35 cwt. per acre.

Oats yielded—off fallow 28 bushels, and wheat was a 33 per cent. better crop off fallow than ploughed land.. Seed: 1 bushel and 56lbs. of Law's superphosphate.

MR. OVERHEN.

Mr. Overhen farms a fine estate of 4,200 acres, known as Nimbedilling, eight miles West of Pingelly. This season 440 acres were cropped, 367 of wheat and 73 oats. Eighty cwt. for hay yielded over two tons per acre, 287 stripped for 16 bushels; 390 of this was fallow land, and the average was over 40 per cent. in favour of the fallow. Fifty pounds of clean seed were used, and 56lbs. of superphosphate. Lodz was the wheat stripped, and Barootа Wonder cut for hay.

MR. MCBURNIE.

This gentleman farms the well-known estate Aldinga, one of the first selected in the Wickepen area, and cropped 350 acres, of which 100 was cut for hay, giving 110 tons; 220 for wheat, giving 16 bushels, and 15 oats, giving 26 bushels. Of this some 80 acres was ground cropped last season but unploughed, simply run over with disc cultivator, the spring-tooth cultivator, and drilled with 65lbs. seed and 60 manure, which gave average of 18 bushels; fallow land gave 33 per cent. ,best crop.

MR. J. STONE.

Of Royal Park, 17 miles West of Pingelly, had 80 acres crop, none fallow; yield 22 cwt. of hay and 12 bushels wheat; 60lbs. of guano and phosphate mixed, and 1 bushel seed.

MR. RITCHIE.

This gentleman farms two miles West of Popanyinning, cropped 90 acres, 20 of which fallowed land. Seventy pounds seed wheat, 80 Thomas' phosphate, yield 10 bushels average, but fallowed land went 14 to 15 bushels.

VICTORIA DISTRICT.

By J. MILLS.

Victoria district promises to be a flourishing one—the agricultural land is second to nothing within the State, is easily cleared, with an abundant rainfall; the grasses are plentiful and of a kind readily eaten by stock, while the indigenous scrubs are soft and excellent feed at the end of summer when grass is parched and scarce. As a wool-producing district, I think it has pride of place for 1906, some of the big clips averaging 1⅜ for fleece and lambs wool, while prices throughout have been most satisfactory. Stock everywhere are in good condition, and with recent heavy rains on the Murchison a good lambing and wool clip are assured in that part. At Northampton, the furthest point north within the State where cereals have been grown successfully, some really good work has been accomplished by the settlers, and where six or seven years ago not more than 20 farms existed fully 100 are now being industriously worked. Added to this there are the lead and copper mines, some of which, owing to the recent rise in price of these minerals, are already raising ore, whilst others are performing preparatory work, in some instances where the workings have been closed for 40 years.

Plate III.—General view showing Amber Cane in the foreground and uncleared bush at the back.
Mr. G. P. Paterson's, Pinjarra.

With cold storage at Geraldton, and the re-purchase and sub-division of some of the big estates which completely hem in the town, backed up by the Murchison Goldfields and that huge tract of fine pastoral country, Geraldton, if not already, must easily become the second port in the State.

DONNYBROOK AND BRIDGETOWN.

By T. Hooper.

I beg to report on my visit of inspection to Donnybrook and Bridgetown. During the week ending 9th March, together with Inspector Wickens, I visited the orchards on the Upper Preston, five of which had had fruit fly found in them by Mr. Wickens in such small quantities as one to five maggoty fruits.

Fruit Fly in Preston Valley.

The fruit in every case was well picked up and the orchards were kept remarkably clean, which reflects credit on the growers. We could not see a single fruit fly, and only one maggoty fruit was found during the days we were in the district. In one orchard a saucer of kerosene had two flies in it, a male and female, but no trace of maggots or flies. We put some kerosene traps in the other orchards, and I have since heard a single fly each was caught in two of them. The outbreak is remarkably small and it is very strange how it occurred, seeing that all the growers use new cases. Since my visit, Mr. Wickens has reported it in two other orchards near Donnybrook. In these the flies were a little more plentiful. To find maggoty fruit when so scarce in such large orchards reflects credit on Inspector Wickens.

I have every hope we shall succeed in eradicating the fly in this district. The district is one admirably adapted to fruit culture and the trees generally, notwithstanding the dry summer, are doing very well. I attended the show whilst at Donnybrook, and was pleased to see so fine a display of fruit, but was given to understand it was not up to the usual standard. On account of the outbreak of fruit fly the Upper Preston people refrained from showing, a considerate action on their part, but one which accounted no doubt for the difference in the quantity shown. Had those growers felt free to show I have no doubt they would have equalled if not surpassed their previous shows. The trophies shown were a distinctive feature and well worth copying by other associations, as they enhanced the general appearance of the exhibits.

Vacuum Oil Emulsion.

From Donnybrook I went on to Bridgetown to investigate the results of spraying with vacuum oil emulsion, and found in one orchard no damage done; in others considerable damage, many trees being either killed or nearly killed, although the applications in each case were identical. I can at present, therefore, only come to the conclusion that weather conditions play an important part on the effects on the trees. It seems to me the warmer the weather after application the more the danger. When, [illegible]fore, such risks obtain I consider it inadvisable for orchardists to use [illegible] on any large portion of their orchard, but rather to go cautiously to work and spray only a few trees which are so diseased as to warrant drastic treatment. For the benefit of growers, I would like it known that the following trees are liable to be killed by the application of the oil emulsion:—All peaches and these apples, Emperor Alexander, Northern Spy, Nickajack, Five Crown, Cox's Orange Pippin.

BRIDGETOWN FRUIT SHOW.

On Wednesday I attended the Nelson fruit show. The display of fruit was very fine, and in some classes such as Jonathans, Dunn's Seedling, and Cleopatra the judge must have had a hard matter to decide which was the best exhibit. The fruit was very clean and well grown, and in addition to other fruits there was a very fine display of grapes. The fruit was displayed on a kind of desk or sloping table divided into squares and running the whole length of the building. It gives one a good view of all the fruit, makes the arranging easy, lessens the chance of mistake, and is a system to be recommended. In going through the district I noticed one or two small uncultivated orchards. In these the fruit was small, the leaves falling off, and the trees struggling to live through the very dry summer we have had. I mention this, as the contrast between these and all the other orchards in the district which are well cultivated was so great, showing the great and important part cultivation plays in an orchard. Notwithstanding the dry summer young cultivated orchards are showing a growth of four or five feet, and on some trees I saw a growth of seven or eight feet.

COOL STORAGE AND FRUIT FLY.

Early this year the attention of the Chief Inspector of Orchards, Mr. T. Hooper, was directed by Mr. E. Bailey, Inspector under the Insect Pests Act, to the fact that some nectarines, subsequently suspected of containing fruit fly larvæ had, after having been kept in cool storage for three weeks, been examined, prior to being offered for sale, when it was found that the larvæ were all dead.

Commenting on this, Mr. T. Hooper reported to the Under Secretary and recommended that cases of maggoty fruit be placed in cold storage at different temperatures for a week or more to determine at what degree of coldness the maggots succumb.

To this minute, Mr. A. Despeissis instructed that exhaustive experiments in the direction indicated be taken in hand, stating at the same time, "That the difficulty would be that after coming out of cool storage the fruit might, when inspected, be seized again as wormy.

"One way of getting over this difficulty would be to arrange with the consignees or their agents, to repack the sound fruit at an appointed place and in the presence of an inspector, who would attend at specified hours.

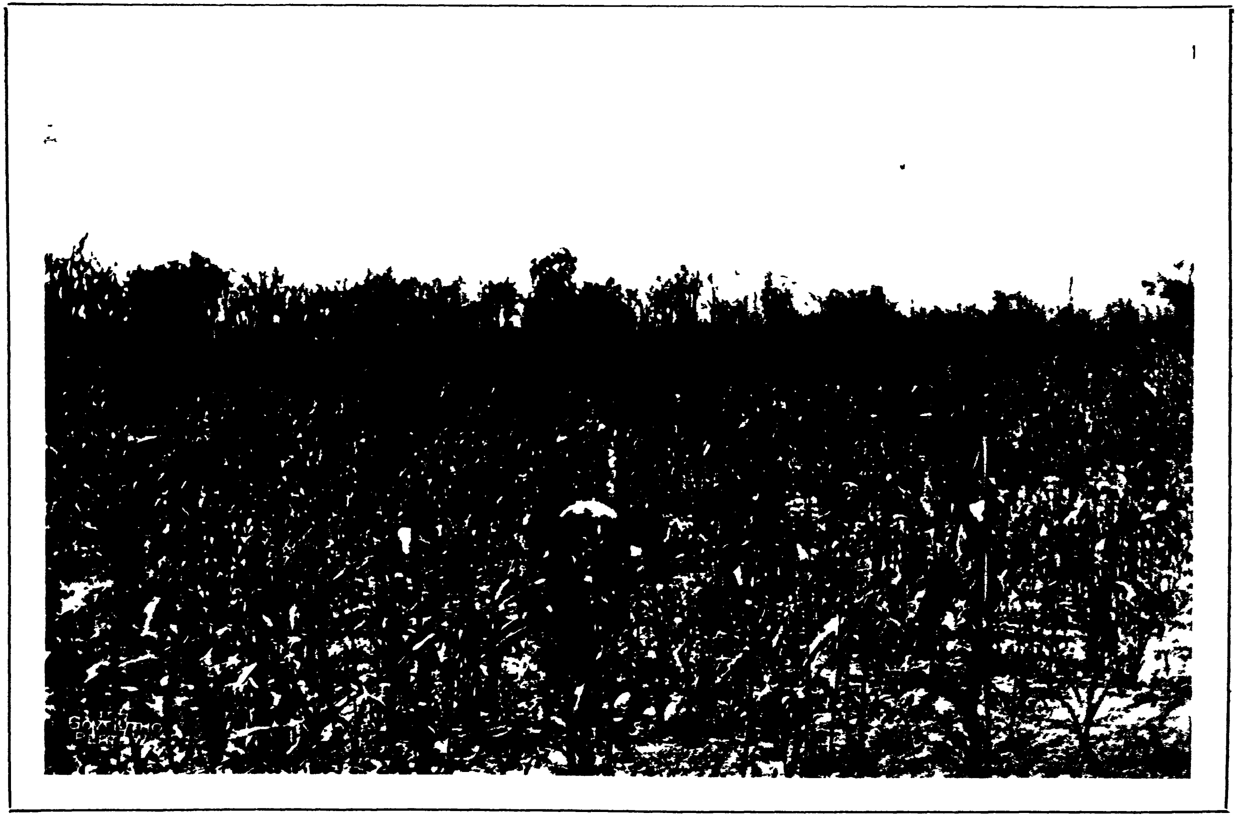


Plate II —Crop of Amber Cane grown on Jarrah land recently cleared by Mr. G. P. Paterson at Pinjarra.

"Such a plan would be better than wholesale destruction of sound fruit with a few bad ones amongst them, and if properly organised would only mean a small charge for cool storage and for handling and sorting—an amount which in many cases would be recouped by the rise in value of the fruit and by the certainty of getting something for that which at times might be considered a doubtful consignment."

After six weeks experimenting in conjunction with Mr. Cairns, the manager of the Government Refrigerating Works, Mr. Hooper reports submitting at the same time tabulated records showing the result of the trials for the destruction of the fruit fly maggot in fruit by means of cold storage. As Mr. Cairns' experience tended to show that these maggots resist temperatures of 44 degrees to 38 degrees F., the wormy fruit tested was subjected to a lower temperature, averaging 33 degrees to 35 degrees F.

The Chief Inspector of Orchards' report states that:—Fifteen days appears as the limit to which the maggot or eggs live; but to make sure it is necessary to give them three weeks. Fruit containing the eggs of the fruit fly had been in cold storage three weeks; upon examination it was found the eggs appeared fresh, but on being subjected to the ordinary temperature they failed to hatch out, and after a few days they shrivelled up. In not one single case could a live maggot be found. Three weeks, therefore, appears to be the time to ensure perfect safety. Appended are the tabulated particulars:—

Fruit.	Inward.	Outward.	No. of days.	Temperature	Maggots, dead or alive
Apples			(12 hours)	34	Alive
Pears	26-2-07	28-2-07	2 days	33 to 35	do.
Apples	22-2-07	26-2-07	4 "	Do.	do.
Do.	22-2-07	28-2-07	6 "	Do	do.
Pears	27-2-07	6-3-07	7 "	Do.	do.
Peaches	18-2-07	26-2-07	8 "	Do.	do.
Do.	18-2-07	28-2-07	10 "	Do.	do.
Apples	22-2-07	5-3-07	11 "	Do.	do.
Do.	26-2-07	10-3-07	12 "	Do	do.
Do.	22-2-07	7-3-07	13 "	Do.	do.
Peaches	18-2-07	4-3-07	14 "	Do	do.
Do.	28-2-07	14-3-07	14 "	Do	Dead
Pears	27-2-07	13-3-07	14 "	Do.	do
Apples	26-2-07	13-3-07	15 "	Do.	Alive
Pears	26-2-07	16-3-07	18 "	Do.	Dead
Peaches	18-2-07	9-3-07	19 "	Do	do.
Apples	22-2-07	14-3-07	20 "	Do.	do.
Peaches	18-2-07	11-3-07	21 "	Do.	do.
Do.	28-2-07	21-3-07	21 "	Do.	do.
Pears	26-2-07	19-3-07	21 "	Do.	do.
Do.	27-2-07	20-3-07	21 "	Do.	do.
Apples	22-2-07	16-3-07	22 "	Do.	do.
Do.	22-2-07	18-3-07	24 "	Do.	do.
Do.	26-2-07	22-3-07	24 "	Do.	do.
Do.	22-2-07	20-3-07	26 "	Do	do.
Do.	26-2-07	25-3-07	27 "	Do	do.
Peaches	18-2-07	17-3-07	27 "	Do	do.
Do.	28-2-07	28-3-07	28 "	Do.	do.
Pears	27-2-07	27-3-07	28 "	Do.	do.
Apples	26-2-07	30-3-07	32 "	Do.	do.

FIGS AND PIGS.

By G. CHITTY BAKER.

For some years past the Department of Agriculture has continually urged the desirability of settlers and others planting fig trees and marketing the crops in the form of pork.

Mr. L. Lindley-Cowen some ten years ago, while Secretary to the Department of Agriculture, penned the following remarks, which were published in the *Settler's Guide* in 1897:—"Figs grow most luxuriantly everywhere in this State, and they are the only trees that you cannot plant too many of. When the fruit is ripe shake the trees and let the pigs pick up the fallen fruit. They will get fat on this without hardly any other food, and can be marketed much easier with far better paying results than could possibly be expected from sending the fruit in by itself."

Mr. W. Paterson, manager of the Agricultural Bank, was always a firm believer in figs as food for not only pigs, but horses and cattle too. He has two plantations on his estate on the banks of the Murray River at Pinjarra, one comprising eight acres, planted seven years ago, and one of thirty acres, planted last year. The first plantation, which is in full bearing, has eight varieties planted. One of the best is a small black fig, the name of which could not be ascertained. The trees bearing this fig are very prolific and have the advantage of dropping their crop so soon as it ripens, thus saving the trouble of picking or shaking them down. The pigs are turned into the orchard, and very quickly make short work of all on the ground. The second plot consists of at least seven or eight different kinds of figs, most of which have been propagated by cuttings from the older plantation. There does not appear to be a single miss, and should in three or four years' time supply abundance of valuable feed.

I saw five horses which I was assured had been fed entirely on figs for the last two months. They had every appearance of being in the pink of condition, fine sleek coats, bright eyes, and literally rolling in fat. The usual feed given to the horses consisted of two kerosene tins of figs mixed with a little chaff. Old horses very soon got fat without losing any activity. By continued experiments it was found that one quart of figs was equal to two quarts of oats, besides being a gentle laxative, keeping the animals in splendid health.

To carry the experiment still further, if we may call it such, grasses might be sown amongst the trees and a permanent pasture made where the ground is naturally moist, although never too wet. Once the trees become well established they can do without cultivation, more especially as the fruit is for feeding and not for market.

I would suggest that so far as the feeding of pigs is concerned, it would be a splendid paying proposition to have small paddocks adjoining the fig plantations cropped in the summer with pea-nuts and sweet potatoes, and in the winter and spring with field peas. All three of these plants make excellent food, and pigs could be turned in for intervals when they could get their fill at any time. The soil is most suitable for all of these crops, any one of which would grow most luxuriantly, the pea-nuts and sweet potatoes supplying both green feed and roots. As I have no data to go on as regards this State, I cannot advocate these matters with the certainty I would like to. At the same time, the experiment would cost so little, and if it should turn out as I anticipate and firmly believe then the gain would be great indeed, and require no more advocacy on my part.

THE BUCKSCRAPER.

A Useful Implement in Farm, Orchard, and other Work.

By W. J. Allen, in the N.S.W. *Agricultural Journal.*

I have been struck in the course of my visits to many parts of the State by the absence of good scoops for levelling land for orchard and other purposes, and I have had many inquiries as to where such an implement could be obtained. The several sketches which I herewith give will serve to illustrate such a scoop, or buckscraper, as it is usually called, and is the implement mostly in use in parts of California and Victoria where large tracts of land have had to be levelled for orchard purposes, lucerne, etc. It has also been found useful for grading roads and making channels and earthen fills; it is most handy for making and cleaning out stock-tanks; in fact, it is claimed to be the best scoop for general use by all who have ever used it. Any blacksmith can easily make the necessary ironwork, and the

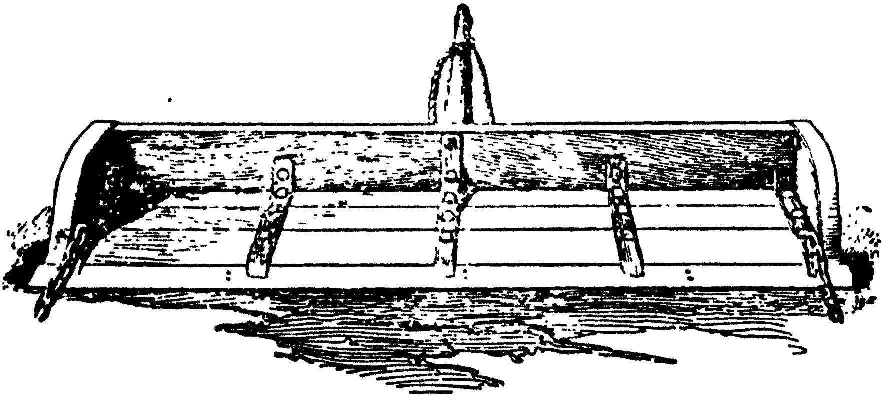


Fig. 1.

woodwork can be put together by any handy man. The buckscraper, as we shall call it, may be made in two sizes; the smaller size 4 feet long, for two horses, and the larger size 7 feet long, for four horses.

Figure No. 1 illustrates the inside of the scoop before being filled, showing the handle at the back, and the two chains, one at either end, by which it is drawn; the larger size having two horses hitched to each chain, and the smaller only one horse to each chain. The chains by which the buckscraper is drawn are 2 feet 9 inches long, with a large ring at the end for convenience in hooking on the swings.

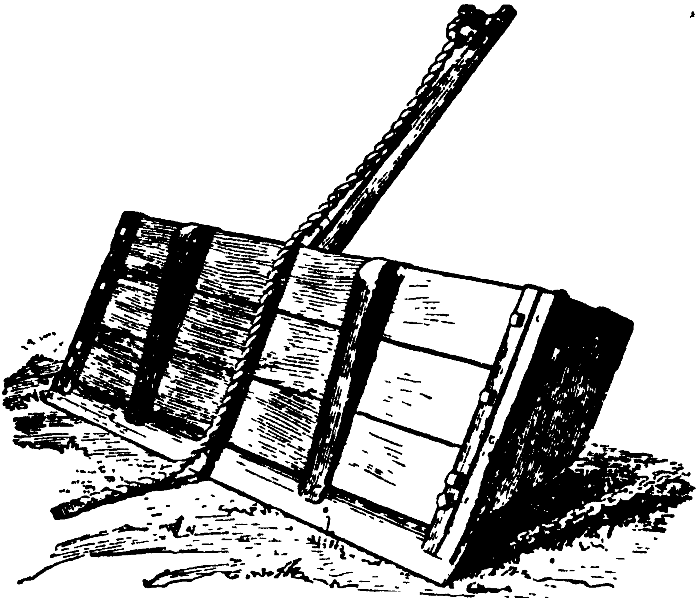


Fig. 2.

Figure No. 2 shows the bottom and end of the buckscraper, and gives a fair idea as to how the implement is constructed. There are two runners, or rockers, which serve to carry the weight when the scoop is filled. These are shod with steel. When empty, it is usually drawn along (as shown in figure No. 2) until ready to fill, the ends acting as runners. These also are shod, to prevent the woodwork from wearing out. There is a 3-inch rope attached to the end of the handle; this is for convenience in bringing the buckscraper into position for filling. The driver, by placing

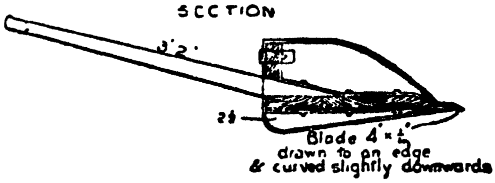


Fig. 3.

his foot on the blade—which, when the scoop is in No. 2 position, is touching the ground at the back—and giving the rope a sharp pull, will easily bring it into position for filling. For the purpose of dumping out the earth, he raises the handle gradually while the horses are moving, the earth emptying itself slowly and being evenly distributed over the surface of the ground, instead of being dumped in a heap, as is ordinarily the case with scoops. This is a great help in doing fine work, such as the final levelling of the land for orchard or lucerne, where it is necessary to have a perfect grade for irrigating, or for roads, fills, etc. The driver will probably take a day or two to become used to the implement, but when he does so he will not change it for any other, as earth is quickly and cheaply removed by it.

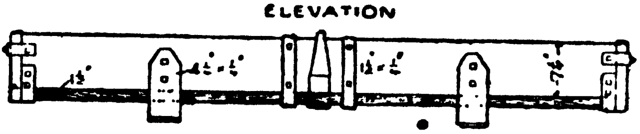


Fig. 4.

The proper yoking of the team is a most important consideration. In the small buckscrapers designed for two horses the swingle-bars are attached as shown in figure 6. Each horse is attached to a single swingle-bar, and is free to move without reference to the other horse, except for the coupling-strap, about two feet long, connecting the horses at the hames. With four horses, they are yoked abreast, but each pair is attached separately to the

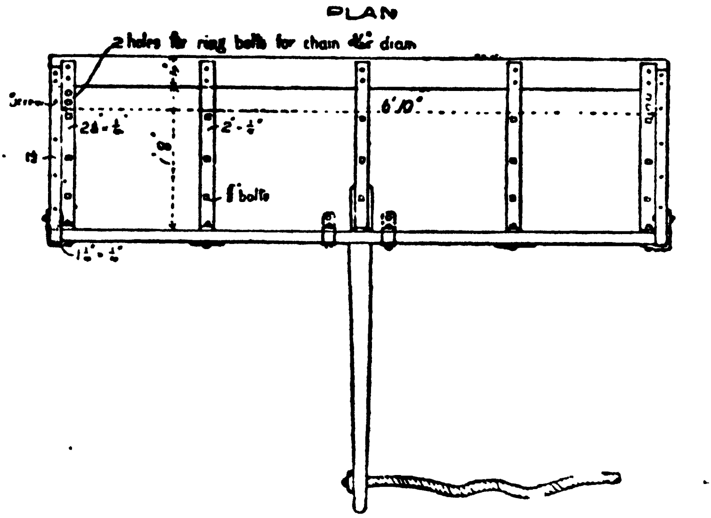


Fig. 5.

draw-chains by means of an ordinary set of two-horse swingle-bars (*see* figure 7). The four horses are connected at the hames to prevent them see-sawing; it also saves the driver, and enables him to control the team better, if the horses are also connected at the bits by a strap or short length of rope; these are better fitted with proper snap-hooks that are quickly undone.

One man performs the whole operation of driving and working the scoop. By using leather reins, of a proper length, driving and turning is easily done. By holding the reins with the hand, and using the upper portion of the arm as a lever, a team of four horses can be turned in an instant, and much better work done than is possible where one man drives and the other works the scoop.

It is strongly advised that leather traces be used, as little trouble from chafing will occur, notwithstanding the great amount of turning and the narrowness of the swingle-bars; but if chains are used, they should be covered with basil or bagging. In yoking-up, do not have the traces longer than is necessary for the team to walk without hitting the bars. Use back-bands, and let the team learn to get back in their places themselves when they get a leg over the traces. They soon learn, and it saves a great deal of time. The buckscraper when full of earth should ride on the runners without digging into the ground, and when empty should be light on the hand, so that little heavy lifting has to be done by the operator. A properly-balanced buckscraper depends on the position of the eye-bolt attachments for the draw-chains and the way the team is yoked-up.

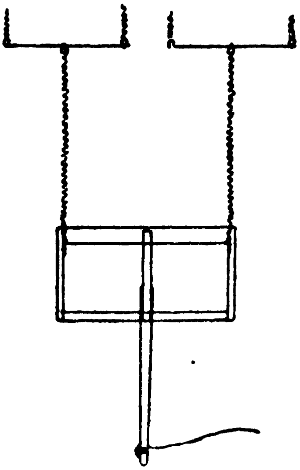


Fig. 6.

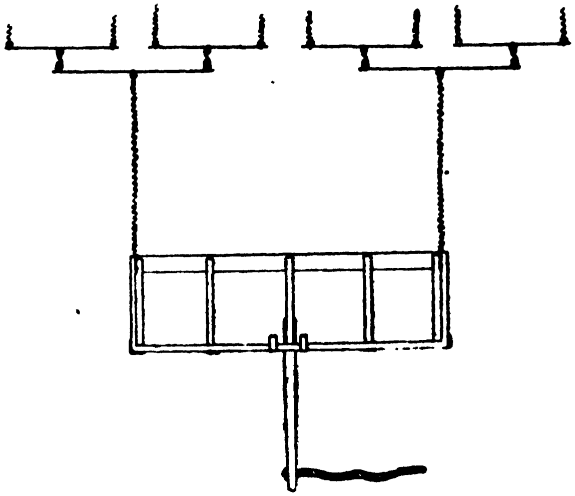


Fig. 7.

Very slight alterations in these particulars may make all the difference between a clumsy machine and one that is easy to work.

AGRICULTURISTS IN CONCLAVE.

A meeting of agriculturists, representing the Royal and numerous country agricultural societies, was held in the Builders' Exchange, Forrest Chambers, to discuss the question of affiliation of the various agricultural societies in the State. Mr. T. W. Hardwick presided during the earlier portion of the business, and in his absence, Messrs. Crawford and Higham presided in turn.

There were present the following delegates:—Messrs. Crawford, Higham, Gorrie, Hardy, Chipper, Paterson, Lowe (Royal Agricultural Society), Wilson (Swan), Bennett (Geraldton), Hales (Bunbury), Gale (South-Western District), Lefroy (Moora), George Lavater (Narrogin), Kent (Pingelly), Parkin (Coogee), Lockyer (Kelmscott), Wm. Reid (Nelson), D. Paterson (Pinjarra), Moore (Irwin), Wilding (Northam), Marwick (York), Gooch (Gascoyne), and G. J. Morgan (Jandakot).

The secretary (Mr. T. R. Lowe) read the circular which had been sent from the Royal Agricultural Society to the various societies explaining the objects of the meeting. The circular read as follows:—"I am directed to inform you, in response to the request made at a meeting of delegates from the various agricultural societies of this State held on April 17 last (at which meeting this society was asked to name the conditions on which it would affiliate), that my society is of opinion that the affiliation of agricultural societies will be beneficial to the shows throughout the State, and in support of its previous action is prepared to join in the movement, and submits the following conditions on which it is willing to affiliate:—The committee of the Royal Agricultural Society shall have the power—(1.) To constitute a court of appeal, to which any person aggrieved by the decision of any agricultural society may appeal. The fee shall be £3 3s.. (2.) To fix dates on which all agricultural shows shall be held. (3.) To confirm or adopt any disqualification or other punishment imposed by the committee of any society. (4.) To remove at any time any disqualification or suspension, fee £3 3s. (5.) To register all societies willing to hold shows under their rules. A register of all societies shall be kept at the office of the Royal Agricultural Society. (6.) Of generally supervising the agricultural shows in Western Australia. (7.) A registration fee of £— shall be paid and an annual fee of £—. All applications for registration must be made in writing, signed by the president and secretary of the society. (8.) All registered societies shall submit for approval a list of judges and schedule of prizes, and shall run under the rules and by-laws of the Royal Agricultural Society. The Minister for Agriculture has been consulted by my committee, and has expressed approval of above." The circular further stated that, although some members of the Royal Agricultural Society would be present at the conference to which they invited delegates from the various societies, they would refrain from voting.

Mr. Hardwick stated that action had been taken some months ago in regard to the affiliation of the Royal Society with the various agricultural societies of the State, but no definite move had been made, with the result that some delay had been experienced. Now, however, they had the suggestions which had been put forward embodied in properly ordered working proposals and the present meeting had been convened to consider the proposals, as outlined in the circular, which the Royal Society had brought before the delegates.

The Minister for Agriculture (Mr. J. Mitchell, M.L.A.) expressed his pleasure at being present at the meeting of delegates. He said that some twelve months ago, at a meeting of the Northam Agricultural Society, he had made the suggestion that the various agricultural bodies should be affiliated with the Royal Society. The clashing of show dates in the country caused considerable difficulty, and they should therefore do their utmost to obviate the occurrence of that undesirable state of affairs. It was wrong, because the subsidies paid to societies by the Government did not under the circumstances give the results expected of them. Affiliation could only take place among a number of societies, and he hoped that, a little later on, there would not be any of the bodies standing out of the union. At the present time the Government was taking considerable interest in the development of agriculture, and it would beneficial to have some central authority, possessing some influence, and which could make representations in regard to various matters of interest. This would be the natural result of the affiliation, and all societies should benefit considerably from it. He referred to the fact that the Government were considering the question of cool storage, and said, in that connection, that agriculturists could give considerable assistance. He hoped that delegates were serious in their contemplation of the question of affiliation which would, he believed, prove the means of doing a great amount of good.

At the outset, delegates agreed to the desirability of joining with the Royal Agricultural Society, and it was resolved that the scheme of affiliation be approved of.

The items included in the Royal Society's letter were then dealt with *seriatim.*

Court of Appeal.

Some discussion took place upon the first suggestion, which read that "the committee of the Royal Agricultural Society shall have the power to constitute a court of appeal, to which any person aggrieved by the decision of any agricultural society may appeal, the fee for which shall be £3 3s." It was, however, adopted.

Dates.

It was resolved that the committee of the Royal Agricultural Society should be empowered to fix dates on which agricultural shows should be held, thus obviating the possibility of shows clashing with each other.

Disqualifications.

The item giving the committee of the Royal Agricultural Society the power to confirm or adopt any disqualification or other punishment imposed by the committee of any society was adopted.

Considerable discussion took place on the fourth item, which read that "the committee of the Royal Agricultural Society shall have the power to remove at any time any disqualification or suspension, at a fee of £3 3s."

It was considered that the fee was too high, and an amendment was carried reducing it to £2 2s., with which alteration the item was adopted.

Registration.

It was resolved that the committee of the Royal Agricultural Society should have power to register all societies willing to hold shows under their rules, a register of all societies being kept at the office of the Royal Agricultural Society.

Supervision.

Item 6, empowering the committee of the Royal Agricultural Society to generally supervise the agricultural societies in Western Australia was adopted.

Fees.

On the seventh clause, which read—"A registration fee shall be paid, and an annual fee. All applications for registration must be made in writing, signed by the president and secretary of the society," considerable discussion ensued as to the amount of fees. It was ultimately decided to fix the registration fee at £1 1s., and the annual fee at £2 2s.

Judges and Prizes.

A lengthy discussion ensued on the last item in the circular, which read that all registered societies should submit for approval a list of judges and schedule of prizes, and should work under the rules and by-laws of the Royal Agricultural Society.

Mr. T. R. Lowe explained that it was intended to ask the various societies to send in names of gentlemen capable of performing the offices of judge, and these would be approved of by the Royal Agricultural Society, unless any serious objection could be raised to them. To illustrate what he meant, Mr. Lowe instanced the Shorthorn section. A society might send down twenty names of gentlemen who could judge the cattle in that section, and their names would be placed on the schedule. Any of these gentlemen could then be selected to officiate at a show, without the society applying to the Royal Society for permission to do so. The provision was made to serve the best interests of the shows, and would be found of great assistance. The names would be included in the official list, copies of which would be sent to each society. Then, if the judges failed any local body, the society interested could immediately refer to the list of officials and select another registered judge. In regard to the schedule of prizes, he pointed out that such a course was necessary in order that a uniform skeleton schedule might be adopted for the guidance of societies in general, and was put forward in order to exercise some supervision over the programmes issued by societies. The Minister for Agriculture was anxious that prizes should only be given for pure-bred animals, and that the encouragement of crossbred animals should be prohibited. It was in that kind the supervision was necessary. With regard to the rules, he remarked that special conditions would naturally have to be made for some country places.

After lengthy discussion the item was carried.

General Business.

On the secretary (Mr. Lowe) pointing out that it was the desire of the Minister that a move in regard to show dates should be made at once, it was resolved that applications for show dates should be in the hands of the secretary not later than June 1.

In regard to notifications of show dates and other matters, it was decided that intimations conveyed through the columns of the societies' official organ would be sufficient.

A sub-committee, consisting of Messrs. Wilding, Hales, Bennett, Lavater, and Marwick should be appointed to further matters in connection with the affiliation, the Minister intimating that free railway passes would be presented to delegates attending the committee meetings.

The Chairman congratulated the delegates on the result of their deliberations, and said their action in affiliating would do more than anything else raise the status of the agricultural industry in Western Australia, and make it a power in the land. In the years to come, he felt confident that they would find that they had effected a good work in the best interests of the State.

The Minister for Agriculture added his congratulations, and characterised the decision of the delegates as being "the right thing to result in good." He believed that they would help the Government to develop the agricultural industry of Western Australia. In asking the Royal Agricultural Society to play so prominent a part, they had done the right thing. In regard to the various societies, he hoped in July next to meet representatives of those bodies in the city, for the purpose of discussing matters in regard to agriculture generally. They had come to a time when there should be no chance of hesitation. They wanted to do something, and the Government desired the aid of the societies in that regard. He proposed to ask the various societies to send representatives to meet him in conference some time during the year. If there was any official help he could furnish to assist the object they had before them, he would make it available, and the various societies throughout the State might rest assured that the present Government would do its best to assist them, for in assisting agriculture they themselves were assisting the Government. Touching on the matter of show dates, the Minister stated that he wanted it to be clearly understood that there would be no subsidy for shows that clashed. It was not right that they should clash, and the Government did not want to have it. That was an aspect which would commend itself to the earnest consideration of societies. He pointed out that even if a society did not have its application for a show date in the hands of the secretary before June 1, the rule did not debar that society from putting in an application after that date, and taking its chance. In conclusion, the Minister referred in complimentary terms to the action the Royal Agricultural Society had taken, and said it reflected every credit upon that body. He asked them to join him in a vote of thanks to the Royal Agricultural Society.

In response to a delegate's suggestion that the proposed conference should be held on one of the State farms, the Minister promised to give the matter consideration.

Mr. Lowe, in replying to the remarks of the Minister in regard to the Royal Agricultural Society, said the object of that body was to advance the interest of agricultural shows, and they recognised that by doing so, they were assisting the State. The Society intended to be educational, and he believed that the affiliation of the various societies would teach them how to become more educational to the people. He pointed out that the people of Western Australia, particularly those interested in agriculture, were much gratified at the great interest the Minister was taking in agricultural matters, and on behalf of the Royal Agricultural Society he wished to publicly thank the Minister.

Before the meeting closed, Mr. Gooch announced, amidst applause, that he would have much pleasure in donating the sum of £10 10s. for the best pen of 10 lambs for export, the matter to be left in the hands of the society.

The meeting then closed with votes of thanks to the Minister and the chairman.

Circular Letter from Department of Agriculture.

With reference to the affiliation of Societies referred to at above conference, the Hon. the Minister for Agriculture has instructed the following circular letter to be sent to each and every agricultural and kindred society in the State:—

"Gentlemen,—

"At a recent conference representative of all the Agricultural Societies throughout the State, a certain measure of affiliation was decided upon. It was resolved that the various Societies should apply prior to 1st June ensuing for allotment of a date (or dates) on which to hold their respective shows. This was found necessary in order to avoid the clashing that has occurred in some instances in past years. Application, stating the day or days considered most suitable, should be made to the Royal Agricultural Society, by whom dates will be allotted.

"I trust the various Societies will support this movement, as I am sure they realise the Government are serious in their endeavours to assist the objects of these bodies. We expend some £3,500 in the disbursement of grants to make the shows a success. In my opinion this money is very well spent, although its full benefit has been somewhat impaired through the incidence of shows in adjacent localities upon the same dates, whereby the benefit that should have accrued has been diminished. The clashing of dates is much to be regretted, and can be avoided in the manner above suggested."

STATE FARM, HAMEL.

REPORT ON POTATOES.

VARIETY TESTS—SUMMER, 1906.

By G. F BERTHOUD.

The potatoes in the following list should have been set out fully one month earlier; however, owing to the land being too wet, this work had to be postponed until favourable weather prevailed. The reader should bear this in mind when looking over the results. Potatoes, when planted late like these were, mature during the hottest months of the season, making such tests very severe; especially for late sorts, which rarely give first class summer crops.

Soil.

These plots are on low land of a light, peaty nature liable to floods during the winter months, and in some parts dry up very quickly during the hot months of the year.

Fertilizer.

Applied to and well mixed in the soil below the sets at the rate of 7 cwts. per acre, composed of 4 parts superphosphate, 1 part sulphate of potash, 1 part sulphate of ammonia; cost, 8s. 9d. per cwt. The above usually gives very good results. Heavier dressing up to half a ton per acre may be applied if desired.

Varieties.

The most popular potatoes in England are those having a white skin and flesh such as "Table Talk" and others. The majority in this class are unsuitable for culture here as a summer crop. They require a long season in which to mature properly. Here they grow very large tops with only a moderate yield of tubers, which are often rooty and inclined to make second growth. They are likewise very liable to leaf and other fungus blights.

Pink.

These are mostly of American origin of which the "Rose" is typical. They mature quickly in from 12 to 14 weeks. From my experience of this climate, I am convinced that these are the hardiest and most profitable sorts to cultivate during the spring and summer months. As a rule, their tops are not very large and fairly healthy.

Purple.

By careful reading of the test list below it will be noted that these are the most tender for leaf blight, and other diseases. Many of them produce tubers of excellent table quality, but are better adapted for growth in a cooler climate. I have for this reason rejected most of the kinds having a purple or blue skin.

Yields.

These are computed accurately from the whole produce of each measured plot, carefully sorted and weighed, thus forming a reliable guide as to the productiveness of each sort under test. Taken as a whole the returns are very good, and above the usual average of summer crops.

Cost of Production.

On these plots, by hand labour for one acre noted below, it is higher than it would be for field culture on a large scale. On the other hand the production may be less.

Dr.	£	s.	d.	Cr.	£	s.	d.
Seed, ½-ton	5	0	0	By Sale 6 tons potatoes ...	36	0	0
Fertiliser, 7 cwt	3	1	3	„ 1 ton small do. for pig feed	2	0	0
Hand planting and digging ...	14	10	0				
Bags	1	10	0				
Railage to Perth	5	0	0				
Cartage from Station to Markets	0	18	0				
Sale Commission	1	16	0				
	£31	15	3		£38	0	0

Sulphate of Copper—(Bluestone.)

Soil on several of the plots were treated with the above, ground fine, rate of from 14 to 28 lbs. per acre, mixed in the fertiliser. My idea being that any germs of fungus disease in the soil would be killed by the copper. The results, although not decisive, were beneficial. The cost of the 28 lbs. dressing, 9s. per acre.

Sulphate of Iron—(Copperas.)

Some plots were treated with sulphate of iron, ground fine, and mixed in the fertilizer, rate of 28 lbs. per acre. The potatoes on these plots showed a notable improvement by the more intense colour of the foliage, and increased vigour of the stalks, but the difference in weight of tubers was slight. A large quantity, say 56 lbs. per acre, may give better results; this last would cost 4s. 6d. per acre.

Bluestone Dip.

Dipping sets when properly done is a useful and simple means of preventing fungoid disease. Solution as follows:—Bluestone, 1 oz. dissolved in 1 pint of hot water; lime, 2 ozs.; treacle, 1 oz., boiled together for fifteen minutes in one pint of water; when done mix with the bluestone solution, adding 4 pints of cold water. It is now ready for use, and will keep for several days. It may be made in large quantities as desired.

Cut sets only should be soaked therein for one hour. The mere dipping of cut sets, or the soaking of whole tubers, are equally useless.

Note.—The above remarks apply to winter, spring, and early summer planting only. For late or January crops, the tubers should be planted whole, cut sets are then very liable to dry rot, and many fail to germinate, or produce weak plants.

Potato Seedling, No. 150.

Planted 13th October, 1906, dug 21st January, 1907. Growth moderate, stalks weak; height to 18 inches; foliage curled and dark green; matures early; tubers oblong, flattened on side, medium size, rather many under size; colour, bright purple, shallow eyes, and nice form; table quality, dry, floury, and fine flavour. The foliage is very liable to the attacks of early brown blight; owing to this fault cannot be recommended for general culture. Pitted for nine weeks, many tubers rotted, not good keeper. Rejected. Approximate yield per acre—Marketable, 3¾ tons; small, 1½ tons.

Potato—"Red River Triumph."

Planted 18th October, 1906; seed local, being first growth from American stock. Tubers very sound and free of disease; cut sets; growth dwarf 15 to 18 inches; even and healthy; matures early, being ready for digging first week in January, 1907. Plot consisted of two rows, each 66 feet in length. No. 1 row, complete fertilizer at the rate of 7 cwt., and ground bluestone 28 lbs. per acre, applied in the furrow and mixed with the soil before planting. No. 2 row same, but without the bluestone. In No. 1 the plants made the best growth and yielded 66 lbs. of large and 4 lbs. of small tubers. No. 2 row, 40 lbs. large and 3 lbs. of small tubers. So far the bluestone appears to be beneficial. Taken up 19th January, time, 13 weeks; tuber fair, even size, round, red, set close stalks; first class market potato, of good table quality. Pitted for nine weeks, only few rotted. Good keeper. Approximate yield per acre (with bluestone)—Marketable, 8 tons; small, ½ ton. (Without bluestone)—Marketable, 5 tons; small, 7 cwt.

Potato—Seedling No. 151.

Planted 15th October, dug 23rd January. Part of the soil on this plot was treated with sulphate of iron and part with sulphate of copper, each at the rate of 28 lbs. per acre, mixed in and applied with the complete fertilizer. The results of each appeared to do good and promote growth. Variety, second early; very vigorous grower; stalks strong and upright; foliage large, flat, and light green; tubers large, skin light pink, form oblong, adhere firmly to root stalk; rather liable to second growth. Many of the potatoes are prongy and ill-shaped. These faults are against it for general culture, otherwise the quality and productiveness are good. Pitted for eight weeks, only a few rotted; fair keeper. Rejected. Approximate yield per acre—Marketable, 4 tons; small, 1½ tons.

Potato—"Radium."

Cut sets planted 18th October; growth moderate; fairly healthy; dwarf height 15 inches. This English variety requires good strong soil, and the cooler autumn months to attain perfection, the soil of these plots being too light to suit it. Dug 26th January, time 14 weeks. Tubers rather small white, round; some plants rooty and poor. Pitted for eight weeks, kept well, only a few rotted. Rejected owing to producing too many small tubers. Yield (approximate) per acre—Marketable, 3¼ tons; small, 2 tons.

Potato—"Duchess of Norfolk."

English variety, third planting here. Soil treated with bluestone, same as last plot. Planted 18th October, cut sets. Growth fairly strong; foliage somewhat diseased with early brown blight; height 15 to 18 inches. This variety is unsatisfactory and tender for summer cropping; owing to this fault have rejected it. Dug 26th January, time 14 weeks. Tubers white, round, rough skin, medium to small. Pitted eight weeks, kept sound. Approximate yield per acre—Marketable, 2¾ tons; small, 1½ tons.

Potato—Reeve's Rose.

American variety, second planting here. Soil of this plot treated with ground sulphate of copper (bluestone), applied at the rate of 28 lbs. per acre in drill with the complete fertilizer. Planted 19th October, cut sets. Growth very even and healthy; height 2 feet; strong stalks. Dug 26th January, time 14 weeks. Tubers medium to large, few small ones. Good shape, oblong, skin pale pink. Good variety for general culture. Pitted for eight weeks, only a few rotted; fair keeper. Approximate yield per acre—Marketable, 6½ tons; small, 13 cwt.

Potato—"Harmony."

American variety, second planting here. Cut sets planted 20th October. Growth even, not tall, 18 inches, but the stalks are strong, with fairly healthy foliage. Dug 28th January, time 14 weeks. Tubers round, pink, netted skin; medium size; nice uniform shape, set close to stalk and easily dug. Pitted eight weeks, kept very sound. A good sort for general cultivation. Approximate yield per acre—Marketable, 7 tons; small, 13 cwt.

Potato—Seedling No. 146.

Cut sets planted 23rd October. Growth very vigorous and healthy. The stalks are strong, but they fall over owing to the heavy foliage, which is very wide, smooth, and dark green. Height to 2 feet. Dug 29th January, time 14 weeks. Tubers of nice shape and size, flat, round, skin deep red, with bright eyes; set close to the stalk and easy to dig. Distinct and promising variety. Pitted eight weeks, kept sound. Approximate yield per acre—Marketable, 4½ tons; small, 1 ton.

Potato—"Roser."

This is an American seedling, raised by Mr. Roser from that good old sort, the "Early Rose." Second planting here, cut sets, 22nd October. Growth very fine and healthy; height 2 feet; foliage pale green, smooth, and fairly free from brown blight. Dug 29th January, time 14 weeks. Tubers kidney-shaped, medium size, skin pale pink, uniform and true to type. Ten plants, grown from sprouts only, yielded 8 lb. of fair tubers. Pitted eight weeks, kept well. Good variety. Approximate yield per acre—Marketable, 7¾ tons; small, ½ ton.

Potato—"Maggie Murphy."

American variety, second planting here. Cut sets. Planted 23rd October. Growth even and vigorous; stalks strong, upright, and of branching habit; foliage healthy. Good hardy sort for general cultivation. Dug 29th January, time 14 weeks. Tubers few to each stalk, but nearly all are large and fit for market. Pebble-shaped, light pink. Pitted for eight weeks; they kept fairly sound, only a few rotting. Approximate yield per acre—Marketable, 6¼ tons; small, 8 cwt.

Potato—"The Livingston."

American variety, second planting here. Cut sets. Planted 23rd October. Growth very slow but fairly healthy; stalks slender; height 15 to 18 inches. Dug 29th January, time 14 weeks. Tubers long, pebble-shaped, skin white and glossy, eyes bright pink. Distinct and handsome for exhibition when well grown, but rather liable to scab. Rejected, unsuitable for general culture here. Approximate yield per acre—Marketable, 4¼ tons; small, 1 ton.

Potato—Seedling No. 194.

Planted 20th October. Cut sets. Growth fairly even; height 2 feet; stalks fall over and have a trailing habit; very liable to the attack of early brown blight. Dug 31st January, time 14 weeks. Tubers numerous, medium size, pebble-shaped, colour light greyish purple. Requires cooler climate to mature properly. Rejected. Approximate yield per acre—Marketable, 4¼ tons; small, 2¼ tons.

Potato—Seedling No. 190.

Planted 3rd November. Cut sets. Growth poor and dwarf; height 15 to 18 inches; foliage diseased with early brown blight. Soil on this plot was very rough, therefore this variety did not get a fair chance. Dug 30th January, time 12 weeks, not fully matured. Tubers small, kidney shape, colour bright pink, shallow eyes. Approximate yield per acre—Marketable, 1¼ tons; small, 1½ tons.

Potato—Seedling No. 196.

Planted 31st October. Cut sets. A few sets failed to germinate. Growth vigorous; height to 2 feet; stalks fall over; foliage heavy, dark green, curled. Very liable to early brown blight. Dug 2nd February, time 14 weeks. Tubers fairly large, colour bright purple. Late and not suitable for general culture here. Rejected. Approximate yield per acre—Marketable, 7 tons; small, 3 tons.

Potato—Seedling No. 197.

Planted 23rd October. Cut sets. Growth moderate; stalks weak; height 18 inches; foliage dark and curled, rather badly blighted. Dug 1st February, time 14 weeks, not fully matured. Tubers small, and pebble-shaped, colour red skin. Poor. Rejected. Approximate yield per acre—Marketable, 1½ tons; small, 1½ tons.

Potato—Seedling No. 140.

Planted 1st November. Cut sets, a few failed to germinate. Growth fair; height to 2 feet; foliage badly affected with the early brown blight. Dug 2nd February, time 14 weeks. Tubers of fair size, white lapstone kidney, shallow eyes, and neat form. Pitted for eight weeks, only a few rotted. Owing to leaf blight, not suitable for general culture. Rejected. Approximate yield per acre—Marketable, 2½ tons; small, 1 ton.

Potato—"Sir Walter Raleigh."

Local, hill grown. Seed presented by Mr. Eberle, of Waroona, for trial. Planted cut sets 1st November. Growth very clean, healthy; foliage flat and wide; height to 18 inches; stalks upright. Dug 2nd February, time 14 weeks. Tubers white, round, large, and of neat even shape. Pitted for eight weeks; when taken up all were sound. One of the best white varieties for general cultivation. Approximate yield per acre—Marketable, 10 tons; small, ¾ ton.

Potato—Seedling No. 185.

Planted 3rd November. Cut sets. Growth even and fair; height 2 feet; foliage dark green and curled, rather diseased; stalks fall over. Dug 5th February, time 14 weeks. Tubers numerous, medium size, pebble shape, skin pale purple. Not fully matured. Rejected. Approximate yield per acre—Marketable, 6 tons; small, 1¼ tons.

Potato—Seedling No. 147.

Planted 2nd November. Cut sets, a few failed to germinate. Growth vigorous and even; height to 30 inches; foliage heavy dark green and curled; stalks fall over; affected by the early brown blight. Dug 4th February, time 14 weeks. Tubers large and fairly uniform in shape and size, flat, round, skin deep purple. This main crop variety was not fully matured when taken up; requires rich damp soil. Rejected. Approximate yield per acre—Marketable, 6 tons; small, ¾ ton.

Potato—"Vermont Gold Coin." (Plot No. 1.)

Planted 31st October. Cut sets. Growth poor; stalks weakly and dwarf; height 15 inches; foliage blighted. Dug 5th March, time 17 weeks, not fully matured. Tubers medium size, skin light yellow, rough and liable to scab in low lands. Pitted eight weeks, kept fairly well. Poor. Rejected. Approximate yield per acre—Marketable, 4¼tons; small, 1 ton.

Potato—Seedling No. 212.

Planted 31st October. Cut sets. Growth strong and even; foliage wide, rather liable to early leaf blight; height 30 inches. Dug 5th February, time 14 weeks, not fully matured. Tubers pebble shape, on some plants rooty, skin rough, light purple, a few showing signs of scab. Pitted for eight weeks, kept fairly well. Rejected. Approximate yield per acre—Marketable, 4¾ tons; small, 2 tons.

Potato—"Vermont Gold Coin." (Plot No. 2.)

Planted 3rd November. Local seed, badly diseased. The cut sets were soaked in Bordeaux mixture for one hour, and a few of the worst for four hours. All germinated well and made vigorous, healthy growth, free of blight. Height 3 feet. The above test, compared with plot 1, will show that the bluestone dip checks disease and promotes healthy growth. Dug 5th March, time 17 weeks. Tubers large, rough skin, late variety. Pitted four weeks, not a good keeper. Rejected. Approximate yield per acre—Marketable, 9½ tons; small, 1½ tons.

Potato—"Pat's Choice."

American variety, second planting here. Planted 23rd October. Cut sets. Growth rather weak; stalks dwarf; height 18 inches; foliage slightly blighted. Dug 7th February, time 14 weeks. Tubers of fair size, long, and even in thickness, skin pink, eyes bright red. Distinct variety but not very productive here. Rejected. Approximate yield per acre—Marketable, 4¼ tons; small, ¾ ton.

Potato—"Rural Red."

American variety, which was originated by E. Carmen; second planting here. Planted 22nd October. Cut sets. Growth fairly vigorous and very even; habit upright; height 18 inches; foliage light green and slightly blighted. Dug 6th February, time 14 weeks. Tubers round to oblong, good market size, few small, skin reddish pink. Pitted for eight weeks, kept very sound. Good variety for general cultivation. Approximate yield per acre—Marketable, 8¾ tons; small, 8 cwt.

Potato—"Midlothian Early."

New variety from Scotland, second planting here. Planted 6th November; cut sets. Growth quick and fine; height 18 inches; foliage light green, flat and smooth, rather badly spotted with brown blight. Dug 8th February, time 13 weeks, were ready 10 days before. Tubers of fair size, pebble shape, skin white, shallow eyes. The tubers were all set close to the stalk and very easy to dig. Pitted six weeks, over one half rotted; bad keeper. Rejected. Approximate yield per acre—Marketable, 4½ tons; small, ½ ton.

Potato—"The Snowball."

Planted 9th November. Cut sets. Growth fairly good; height to 2 feet; stalks weak, fall over; foliage diseased with brown blight. Dug 9th February, time, 13 weeks, not fully matured. Tubers of fair size, round to oblong, white skin. Pitted for six weeks, rather a large number rotted. Rejected. Yield (approximate) per acre—Marketable, 3½ tons; small, ¾ ton.

Potato—"Noroton Beauty."

American variety, second planting here. Planted 7th November. Cut sets. Growth rapid; strong stalks, upright habit; height 18 inches; foliage wide and smooth, slightly blighted. Dug 8th February, time 13 weeks. Tubers large, very few small ones; shape round and uniform, skin light pink, with deeper shade about the eyes. Tubers set close to stalks and very easily dug. Pitted six weeks, kept well. A good early variety. Yield (approximate) per acre—Marketable, 5 tons; small, ¼ ton.

Potato—Seedling No. 277.

Planted 15th November. Cut sets. Growth fairly healthy, but dwarf; height 12 inches. Dug 12th February, time 13 weeks, not fully matured. Tubers small, white, kidney, shallow eyes, good quality, but not very productive. Rejected. Yield (approximate) per acre—Marketable, ½ ton; small, 1¼ tons.

Potato—"Southern Queen."

English variety, second planting here. Planted 10th November. Cut sets. Growth very good; height 2 feet; strong stalks; wide flat foliage, slightly diseased. Dug 13th February, time 13 weeks, not fully matured. Tubers white, kidney, good shape, and shallow eyes; set rather far from stalks, and hard to dig. Pitted for six weeks, kept sound. Fair variety. Yield (approximate) per acre—Marketable, 4 tons; small, 1 ton.

Potato—"The Clinton."

American variety, second planting here. Planted 23rd October. Growth healthy and clean; strong stalks; height 2 feet. Dug 4th March, time 18 weeks. Tubers oblong, white, rough skin; large, very few small ones. Pitted four weeks, kept sound. Fair sort but too slow for general culture here. Approximate yield per acre—Marketable, 10¼ tons; small, 1 ton.

Potato—"Pink Blossom."

Planted 22nd October. Cut sets. Growth healthy and vigorous; height 30 inches. Dug 4th March, time 18 weeks. Tubers oblong, white skin, numerous, but uneven in size and shape. Pitted for four weeks, a considerable number rotted. Too late for general culture. Rejected. Approximate yield per acre—Marketable, 7 tons; small, 4 tons.

Potato—Seedling No. 187.

Planted 3rd November. Cut sets. Growth fairly healthy; stalks rather weak; height 18 inches. Dug 5th March, time 17 weeks. Tubers of medium size, white, kidney, shallow eyes. Good cooking quality. Pitted four weeks, kept well; late variety and not very prolific. Rejected. Approximate yield per acre—Marketable, 6 tons; small, 2½ tons.

Potato—Italian Imported Seed.

Presented for trial by Mr. McNeill, of Waroona. Growth even and healthy; stalks slender but upright; foliage light green, curled. Dug 5th March, time 17 weeks. Tubers round, white, deep eyes, rough skin, medium size, many below market size. Good keeper. Late variety poor. Approximate yield per acre—Marketable, 5½ tons; small, 2½ tons.

Potato—"Gem of the South."

Seed imported from the raiser, Mr. R. Kidd, of Invermay, Tasmania. Planted 6th November. Cut sets. Very sound seed; a few failed to germinate. Growth slow but healthy; stalks slender, of trailing habit; length 5 feet; foliage curled and dark green. Dug 17th March, time 17 weeks. Tubers kidney-shaped, medium size, rooty and ill-formed, skin light reddish purple. Poor late variety, not desirable for this locality; might give better results if planted in January for digging late in May. Pitted four weeks, kept sound. Yield (approximate) per acre—Marketable, 3 tons; small, 1 ton.

Potato—"The Factor."

Local seed, planted 6th November. Cut sets. Growth very strong and healthy; stalks upright; height 3 to 4 feet. Dug 7th March, time 17 weeks. Tubers oblong, white skin, many badly shaped. This variety, like many others of the English white sorts, soon deteriorates in this hot climate, and usually give the best results when planted in autumn instead of late spring, like these plots. Approximate yield per acre—Marketable, 10 tons; small, 1¾ tons.

Potato—Seedling No. 155.

Planted 6th November. Cut sets. Growth healthy; height 2 feet; foliage very dark green and curled, rather liable to brown blight; flowers rich violet blue; distinct from all other varieties grown here. Dug 7th March, time 17 weeks. Tubers large, pebble-shaped, uniform in size, skin dark blue. Good for exhibition. Pitted four weeks, kept sound. Late variety, for further trial. Approximate yield per acre—Marketable, 6 tons; small, ¾ ton.

Potato—"Table Talk."

English variety, second planting here. Planted 13th November. Cut sets. Growth very even and vigorous; strong stalks, free from leaf disease; height to 4 feet. Dug 8th March, time 16 weeks. Tubers large, white, round, smooth skin. Good cooking quality. Moderately productive; requires a cooler climate and rich soil to attain perfection. Rejected. Approximate yield per acre—Marketable, 6 tons; small, 2 tons.

Potato—"Violet" (Solanum Commersoni.)

Second planting here. Planted 19th November. Growth rather weakly; habit upright; height to 2 feet; foliage rather liable to early brown blight. Dug 15th March, time 15 weeks. Tubers of medium size, pebble-shaped, and fairly uniform; skin smooth, bright violet. Distinct, but not very promising. Approximate yield per acre—Marketable, 4 tons; small, ¼ ton.

Potato—"Queen of the Veldt."

Planted 16th November. Growth moderate; height to 2 feet; stalks fall over; several plants diseased. Dug 18th March, time 17 weeks. Tubers large, oblong, light purple; bad keeper. Rejected. Yield (approximate) per acre—Marketable, 3½ tons; small, ¾ ton.

Potato—"Royal Purple."

English variety, second planting here. Planted 14th November. Growth upright; slim stalks; height to 30 inches; foliage curled and dark green; some plants badly diseased. Dug 18th March, time 17 weeks. Tubers numerous, medium to small, kidney-shaped; skin smooth and bright purple. Bad keeper. Rejected. Yield (approximate) per acre—Marketable, 4 tons; small, 1¾ tons.

Potato—"The Highlander."

English variety, second planting here. Planted 16th November. Growth healthy; height to 2 feet. Dug 18th March, time 17 weeks. Tubers white, pebble-shaped, many small and rooty; late and poor variety. Rejected. Yield (approximate) per acre—Marketable, 3 tons; small, 1 ton.

Potato—"Peckover."

English variety, second planting here. Planted 18th November. Cut sets. Growth strong and healthy; upright habit; height 30 inches. Dug 18th March, time 17 weeks. Tubers white, round, medium, few per stalk, keeps fairly sound. Not suitable for summer crop. Rejected. Yield (approximate) per acre—Marketable, 3¾ tons; small, 1 ton.

Potato—"Coronation."

Victorian variety, local seed. Planted 17th November. Cut sets. Growth fine and healthy; height to 3 feet; stalks weak, fall over. Dug 19th March, 17 weeks from time of planting. Tubers of fair size, oblong, skin purple. Late variety, not suitable for summer culture here. Yield (approximate) per acre—Marketable, 4 tons; small, 1 ton.

Potato—"Bright Eyes."

English variety, second planting here. Planted 16th November. Cut sets. Growth fairly healthy; stalks weak, fall over; height to 3 feet. Dug 18th March, 17 weeks from time of planting. Tubers of fair size, and form oblong, skin smooth, pale pink, with red eyes. Late variety; not prolific. Rejected. Yield (approximate) per acre—Marketable, 4 tons; small, ½ ton.

PARASITES.

By L. J. Newman.

On March 4th, 1907, this Department received per mail boat from California, a consignment of ladybirds (two species) in fair condition—one species 52 strong (*chilocorus bivulnerus*, twice-stabbed ladybird) and another species 6 strong (*hippodamia ambigua*).

These are general scale and aphis feeders, and have been liberated in orchards with an abundance of food, and when established will be collected and distributed to different parts of the State.

A package of soft brown scale parasites was also received at the same time, and from this up to date two species of internal parasites have issued (coccophagus lecani) and one unnamed. These have been liberated and I hope will establish themselves. The red scale parasite, introduced from China by Mr. Compere 12 months ago, and the Palestine ladybird, also introduced, are showing up in great force, colonies of which are being collected and mailed to the different applicants with the quickest possible despatch. Mr. Compere has also been successful in introducing into California from China and India four new species of internal parasites on this scale, which have become established, and strong colonies are to be forwarded to this State next spring.

NARROGIN EXPERIMENTAL FARM.

Crop and Manure Tests.

By R. C. Baird.

The following returns are of the crop and manure tests made on the farm, as follows:—

Wheat (plots, quarter acre).

Sown with 60lbs. of seed to the acre on the 28th of May last, 168lbs. of super. being used to the acre.

Variety.	Yield per acre.	Remarks.
1. Alpha	9 bushels ...	A good early variety
2. Aust. Talavera...	8⅛ " ...	A good early wheat; makes good hay
3. Jade	9½ " ...	Midseason wheat; plump grain
4. Sullivan's E. P.	7½ " ..	Plump grain; shells badly
5. Medic	6¾ " ...	Yield poor, owing to wet ground
6. Baroota Wonder	10 " ..	A good yielding midseason wheat
7. Marshall's No. 3.	10 " .	Do. do.
8. Fillbag	8¾ " .	Plump grain; strong grower
9. Silver King ...	7¼ " ...	Midseason; good grain
10. Federation ...	11½ " ...	Midseason; brown chaff; good yielder
11. White Lammas	7 " ...	Midseason; good hay wheat
12. Lucky Talavera	8¾ " ...	Grain dark in colour and small
13. Tardent's Blue ..	6½ " ...	Late wheat; suffered from too much wet
14. Plover	7¼ " ...	Early; good grain
15. Toby' Luck ...	9½ " ...	Early; good grain, strong straw
16. Blue Stem ...	5⅛ " ...	Late variety; grain small
17. John Brown ...	7⅞ " .	Midseason to late; fair grain
18. Power's Fife ...	7⅓ " .	Very late; requires early sowing
19. Whitney's Fife	6⅛ " .	Do do
20. Goldsmith ..	12 " ...	Midseason; good grain
21. Whitlock ...	11½ " ...	Midseason; good hay wheat
22. York Champion	12 " ...	Midseason; large headed; good yielder

Oats (plots half acre).

50lbs. to the acre, 29th May.

1. Early Ripe ...	9 bushels ...	Early, tall growing, good for hay
2. Calcutta ...	15¾ " ...	Early, good yielder, weak straw
3. White Siberian	14½ " ...	A good yielding variety
4. Golden Fleece	13¾ " ...	Good plump grain
5. Algerian ...	13⅝ " ...	A good all round oat

Rye.

1. Summer Saxon	10⅛ bushels ...	A tall growing variety

Manure Test Plots 1906-7.

Sown with Federation Wheat 60lbs. to the acre, 30th May. Plots, ¼ acre.

No. of Plot.	Kind and Quantity of Manure used.			Cost per acre.		Yield per acre.	Remarks.
		s.	d.	s.	d.	bush.	
1	No Manure	...	...	...		7⅕	
2	56lbs. of Super	...	...	2	3	7¾	
3	112lbs. „	...	...	4	6	8⅓	
4	168lbs. „	...	...	6	9	11⅕	
5	224lbs. „	...	...	9	0	11⅕	
6	168lbs. „	6	9	15	3	13⅓	
	56lbs. Sulph. Ammon.	8	6				
7	168lbs. Super.	6	9	14	3	12¾	
	56lbs. Nitrate Soda	7	6				
8	168lbs. Super.	6	9	14	3	12⅓	
	56lbs. Nitr. of Soda (top dressing) ...	7	6				
9	168lbs. Super.	6	9	15	3	12⅓	
	56lbs. Sulph. Ammon. (top dressing)	8	6				
10	168lbs. Super.	6	9	22	3	11⅗	
	56lbs. Pot Sulph. } (top dressing)	8	0				
	56lbs. Nitr of Soda } (top dressing)	7	6				
11	168lbs. Super.	6	9	23	3	11⅛	
	56lbs. Pot. Sulph. } (top dressing)	8	0				
	56lbs. Sulph. Ammon. } (top dressing)	8	6				
12	168lbs. Super.	6	9	14	9	9⅞	
	56lbs. Pot. Sulph.	8	0				
13	168lbs. Super.	6	9	14	9	8	
	56lbs. Muriate Potash...	8	0				
14	112lbs. Sulph. Ammon.	17	0	17	0	6⅓	
15	112lbs. Nitrate Soda	15	0	15	0	5	
16	112lbs. Potash Sulph.	16	0	16	0	6	
17	112lbs. Muriate Potash	16	0	16	0	7⅓	
18	168lbs. Super.	6	9	6	9	10	
19	168lbs. Bone-dust	7	6	11	3	10¼	
20	84lbs. Super.	3	4½	9	0	10⅓	
	84lbs. Bone-dust	5	7½				

Results of Field Crops, 1906-7.

Variety.	Date of Sowing.	Manure, Rate per Acre.	Yield per Acre.	Remarks.
Wheat.				
York Champion ...	May 25	Super., 1¼cwts.	8 bush.	Good grain, strong straw.
Bobs	„ 30	„ „	4 „	Grown on rocky ridges
Federation	June 1	„ 130lbs.	9 „	Sown rather late; badly affected by wet.
Marshall's No. 3 ...	„ 8	„ „	7 „	Grown on poor, sandy soil.
Goldsmith	July 1	„ 112lbs.	8 „	Nice even crop; good for hay.
Barootа Wonder ...	„ 4	„ „	7 „	Good all-round variety.
Jade	June 13	„ „	...	Cut for hay. Approximate yield, 18cwt. per acre.
Fillbag	„ 15	„ „	...	
Australian Talavera	„ 17	„ „	...	
Alpha	„ 20	„ „	...	

Results of Field Crops, 1906-7—continued.

Variety.	Date of Sowing.	Manure, Rate per acre.	Yield per Acre.	Remarks.
OATS.				
Algerian	June 21	Super., 112lbs.	16½ bush.	Fairly plump grain.
Calcutta	May 25	„ „	16 „	Good grain; straw rather weak.
BARLEY.				
Cape	„ 15	„ „	6 „	This crop was grazed until October.
RYE.				
Summer Saxon ...	„ 25	„ 90lbs.	10 „	Tall-growing, good variety.

POULTRY NOTES.

By FRANK H. ROBERTSON.

One of the first things the novice poultry-keeper has to learn is to know how to handle his stock—I mean how to catch, hold, carry, or lift his birds. Perhaps some will say such is a very trivial matter; it may be, but fowls individually reckoned are small things, so are eggs, but they bring in big money, especially if you have plenty of them, and if one is raising fowls in a fairly large way there is a rare lot of handling to be done, and if it is not done properly a good deal of damage may be done to the birds, and a large amount of unnecessary sprinting indulged in by chasing hens all over the farm. For my part, I never run after a fowl, they can travel a great deal faster than I can; drive them along quietly. It is something like handling a mob of horses; keep them well together and send them along at a walk or slow trot into the stockyard. But as we don't get on horseback to round up fowls, have one or two assistants, and quietly drive the birds into a corner, in which is placed a wire-netted coop which has its door at the side. It is also of great assistance to have all lanes between rows of runs netted with a good high fence at one end at least, with a gate which can be opened or closed as desired. When rounding up the birds do it as quietly as possible, keeping them at a walking pace only, and by means of a small bough they can be driven in any direction required, always keeping a sharp look out to see which way they are heading. Never make frantic arm's-length rushes at the tails of running birds, as the result too often happens of getting nothing but a handful of feathers, and the spoiling the sale of a good bird. Make sure of your hold, by the legs for preference, but do not carry in this manner. A

The Duck Pens at the Subiaco Competition.

gentle hold can be often taken of the tail until the legs or wings are secured, but ducks should never be caught or carried by the legs; round the neck or both wings close to the back. When lifting fowls from one crate to another, a firm hold of both wings is the most convenient mode; great cruelty is frequently indulged in at poulterers' shops and auction rooms by carrying fowls in large numbers in sacks. Turkeys should never be caught by the plumage as their feathers come out very easily. Never more than one or two fowls should be carried in a sack, and plenty of ventilation should be provided. This is best done with a scissors, by cutting clean out shall circular pieces of the bagging. A single bird can be comfortably carried in a sugar bag, without damaging the plumage, provided a small piece of planking about 6 inches long and 3 inches wide is placed in the bottom of the bag for the bird to stand on. When catching ducks, do not chase them or run them down, as such treatment plays havoc with them, especially in the laying season. Having caught a fowl, never allow it to make the usual distressing screeching; it is easily stopped by placing a finger to the throat of the bird at the spot where the larynx is located. When shifting hens which have gone broody in the laying nests, night-time is best for doing this work, but it can often be successfully managed in broad daylight. Take a China egg and place it under the hen on the nest, then raise the bird off and keep the egg pressing against the breast-bone of the bird, and with the other hand blindfold the bird, or keep it in darkness by means of a piece of sacking, and gently place on the new nest, covering it up to keep the bird in darkness. Next day remove the covering to the nest and allow the bird to come off to feed of its own accord. When giving fowls medicine with a spoon, hold the bird firmly to your left side, keeping it in position by means of your elbow, and with the left fore-finger and thumb hold the comb; then with the little finger of same hand open the bird's beak and with the right hand administer the medicine. The bird thus has the free use of its beak and can swallow the liquid without fear of choking.

A neighbouring farmer here at Narrogin had the misfortune to find six of his pure Toulouse geese suddenly take ill and die very quickly. The birds were sent to the writer for examination, and on opening them, the proventriculus, or what serves as a stomach to poultry, was full of coarse green leaves, something like young maize, and unmistakable evidences in the intestines of poisoning. An examination of the paddocks was made, and in one of them was found some amber cane roots, from which were sprouting young foliage. The geese had eaten heartily of this. The partially-digested greenstuff was taken from one of the geese and forwarded to Mr. Mann, the Government Analyst, who, in his report, states that: "The material contained prussic acid. This plant and others of the same family are well-known to give rise to prussic acid, especially at certain stages of growth, and great losses of cattle have been caused thereby in Queensland and elsewhere. This probably explains the matter. It should not be used too young. Recent researches show that molasses can be used as antidote."

From this experience it behoves poultry-keepers and stock owners to see that live stock of any kind do not have access to sprouting sorghum or amber cane. At the same time I might mention that horses were running in the same paddock as the geese and no harm has occurred to them, the reason of this no doubt being that the small quantity the horses would pick up would do them no harm. Young maize is said also to be dangerous, but last year being short of greenstuff, we gave the poultry a lot of chopped young maize without them experiencing any bad effects.

Secretaries of shows in England have a hard time of it owing to so many exhibitors sending in entries after closing dates, also shortness of entries compelling them to extend the date of receiving. There is of late a tendency here to indulge in this practice, which it is to be hoped will not become general. Far better to make an occasional small entry show and stick to the closing date rather than allow exhibitors to get into the habit of looking forward to the extension of time as an accepted custom; besides, it is not fair to the exhibitors who have gone to the trouble of entering at the advertised time.

There is some new variety of poultry continually coming out in England and being boomed for all it is worth: the latest is Black Wyandottes.

A correspondent in the *Feathered World* speaks very highly of the cross Golden-pencilled Hamburgh cock and Buff Cochin hens as splendid layers. The crossing of two pure breeds is not much indulged in nowadays, as there are so many varieties of pure-breds to choose from.

Another correspondent states that all eggs imported into England should be stamped with the name of the country they came from, when offered for sale in shops, thus preventing foreign eggs being palmed off as "prime fresh," "new laid," and so on.

English amateur fanciers are complaining very strongly about the professional poultrymen sending teams of birds to all the little country shows and scooping the pool, or sweeping the decks, as it is called, viz., winning all the prizes and not giving the small amateur a fair show to win a first prize. The amateurs are endeavouring to form a league to protect their interests in this respect.

Two kinds of Black Langshans are now being exhibited at English shows, viz., the extra tall close-feathered type, and the bird as it was originally introduced and known as the Crood type, much shorter in the leg and looser in feather; separate classes are given for each. There has of late been a strong feeling in England in favour of the old type, and a club has been formed to bring it to the front again.

THE EGG-LAYING COMPETITIONS.

From the *W.A. Poultry Gazette* we learn the figures of leading pens in the Eastern States to end of March. The Hawkesbury 12 months is completed, and has brought an old breed strongly into prominence, which is generally considered not a great layer, but a fine all-round variety, viz., Langshans. There they have won with the splendid total of 1,481, which is so far a record, beating the sensational 1,461 laid by Black Orpingtons last year at Rockdale. White Leghorns at Queensland ran them very close with only one egg less, viz., 1,480. But all these totals are likely to be exceeded by the birds at our

Subiaco competition, judging by the remarkable yields made by the leading pen by the Sunnyhurst, from South Australia. Their score to the end of March is 1,255, and they have three months yet to run. A remarkable feature of our West Australian competitions is the excellence of the laying for the month of March, being, in most instances, far above the Eastern States' competitions. This is a good feature, as eggs are high in value now.

The Narrogin competition finishes at the end of this month, and will not be renewed. The pens (25) will come in splendidly as breeding pens during the coming season, and will be of great use in that respect.

The demand for pure-bred poultry this season, of all kinds, is very brisk; the stocks for sale consists chiefly of White and Brown Leghorn cockerels, Indian Runner drakes, Pekin ducks and drakes, and a few Plymouth Rock and Silver Wyandotte cockerels; also a fine lot or Toulouse geese.

EGG-LAYING COMPETITION.

NARROGIN MONTHLY RECORD.

The following are the results of the egg-laying competition at the State Farm, Narrogin, for the eleven months ended with March last. There is still one month to run: –

	Breed.	Owner.	Total for Month.	Total to Date.
1.	Brown Leghorns	E. E. Ransford	108	1,226
2.	Silver Wyandottes	A. M. Neitchke	94	1,116
3.	White Leghorns	Mrs. A. Bristow	102	1,109
4.	Brown Leghorns	Mrs. R. A. Dusting	106	1,075
5.	White Leghorns	F. Piaggio	85	1,047
6.	Do. do.	C. W. Johnson	102	1,039
7.	Do. do.	Aveley Yards	88	989
8.	Buff Orpingtons	A. H. Hilton	77	976
9.	White Leghorns	Miss M. Parker	63	946
10.	Silver Wyandottes	Miss Buttsworth	89	921
11.	White Leghorns	A. F. Spencer	63	902
12.	Do. do.	F. J. Williams	82	875
13.	Brown Leghorns	J. D. Wilson	63	872
14.	Black Orpingtons	Sparks & Binnington	85	872
15.	White Leghorns	J. Handley	46	855
16.	Silver Wyandottes	G. W. G. Lizars	74	852
17.	R.C. Brown Leghorns	Adelaide Yards	76	831
18.	White Leghorns	J. E. Tull	65	807
19.	Black Orpingtons	Perth Yards	63	793
20.	Golden Wyandottes	W. J. Craig	53	792
21.	White Wyandottes	Mrs. S. J. Hood	54	781
22.	White Leghorns	R. G. Flynn	33	752
23.	Do. do.	O. C. Rath	34	742
24.	Do. do.	G. Oneto	57	702
25.	R.C. Brown Leghorns	E. Krachler	39	683
		Totals	1,801	22,645

SUBIACO MONTHLY RECORD—MARCH.

[Commenced on July 1. To close on June 30, 1907.]

Fowls.

Six hens in each pen.

	Owner and Breed.	1907. Mar.	Total for nine months.
1.	Sunnyhurst (S.A.), *W. Leghorn	123	1,255
2.	A. H. Padman (S.A.), *W. Leghorn	112	1,132
3.	S. Craig, *W. Leghorn	125	1,123
4.	Ericville Egg Farm, *W. Leghorn	123	1,043
5.	E. Garbett, W. Leghorn	103	1,040
6.	E. Palmerston, W. Leghorn	127	1,033
7.	J. D. Smith, *W. Leghorn	98	1,021
8.	Austin and Thomas, W. Leghorns	111	1,015
9.	Ryan Bros., *W. Leghorn	91	1,013
10.	J. R. Parkes, Brown Leghorn	94	1,000
11.	E. Fitzgerald, W. Leghorn	103	1,000
12.	G. W. G. Lizars, *W. Leghorn	75	997
13.	Bungalow Farm, Brown Leghorn	108	991
14.	A. H. Padman (S.A.), *S. Wyandotte	104	985
15.	F. Whitfield, Brown Leghorn	87	984
16.	Bon Accord, W. Leghorn	96	976
17.	F. Piaggio, W. Leghorn	97	961
18.	G. M. Buttsworth, *W. Leghorn	108	951
19.	W. J. Clarke, Brown Leghorn	82	950
20.	C. W. Johnson, *W. Leghorn	110	942
21.	Mrs. McGree, *W. Leghorn	99	933
22.	J. W. Buttsworth, *W. Leghorn	91	930
23.	A. F. Farrant, Partridge Wyandotte	61	909
24.	Adelaide Yard, W. Leghorn	104	909
25.	W. Snowden, Brown Leghorn	86	900
26.	F. T. Rowe, *Black Orpington	72	884
27.	Bungalow Farm, *W. Leghorn	90	884
28.	F. Whitfield, *W. Leghorn	81	863
29.	Mrs. Hughes, *R. C. B. Leghorn	64	842
30.	E. Hutchinson, *Minorcas	76	824
31.	H. M. Kelly, *G. Wyandotte	92	823
32.	A. S. B. Craig, *W. Wyandotte	82	821
33.	A. Snell, *Brown Leghorn	53	817
34.	W. Wade, W. Leghorn	77	816
35.	C. Attwell, *S. Wyandotte	72	814
36.	A. R. Keesing, Minorcas	57	799
37.	O. K., *Black Orpington	84	794
38.	H. Jones, W. Leghorn	45	792
39.	R. G. Flynn, W. Leghorn	69	792
40.	B. Jones, *S. Wyandotte	78	788
41.	J. White, Brown Leghorn	60	785
42.	L. Meatchem, *G. Wyandotte	67	775
43	Geo. Bolger, *Black Orpington	75	774
44.	Perth Yard, W. Leghorn	82	771
45.	E. A. Newton, W. Leghorn	81	756
46	C. R. Roberts, *W. Leghorn	43	748
47.	Ericville Egg Farm, *Black Orpington	58	736
48.	Honnor and Forbes, R. C. W. Leghorn	62	733
49.	J. W. Buttsworth, S. Wyandotte	64	731
50.	C. L. Braddock, S. Wyandotte	73	[illegible]
51.	R. G. Smith, W. Wyandotte	84	[illegible]
52.	F. Mason, W. Leghorn	55	[illegible]
53.	W. Snowden, S. Wyandotte	60	[illegible]
54.	Glen Donald Yard, G. Wyandotte	68	[illegible]
55.	C. Crawley, B. Orpington	57	[illegible]

* Male birds were placed in these pens on August 1.

"THE MARVELS OF THE YARD."

Mr. E. Palmerston's pen of white Leghorn pullets, now in the Subiaco competition. They commenced to moult in December, and have been almost naked for some weeks, yet they continue to lay with great regularity.

FOWLS—*continued.*

	Owner and Breed.	Mar.	Total for nine months.
56.	A. Coombs, S Wyandotte	68	698
57	J S Miller, S Wyandotte	67	672
58	Mrs McGree, W Wyandotte	72	660
59	H M Kelly, *B Orpington	54	656
60	H. H Wegg, G. Wyandotte	62	632
61	Jas Kirk, G. Wyandotte	71	631
62	A. Savage, Minorca	42	615
63	J. E. Redman, S Wyandotte	60	608
64	J. B Pettit, S Wyandotte	49	576
	Total	5,144	54,205

DUCKS

Four in each Pen.

	Owner and Breed.	Mar.	Total for nine months.
1	R A Dusting, *Indian Runner	81	889
2	Austin and Thomas, *Indian Runner	38	772
3	F D Vincent, *Indian Runner	99	760
4	Adelaide Poultry Yard, Indian Runner	50	740
5	Miss E Parker, Indian Runner	31	710
6	A Snell, *Indian Runner	47	701
7	F T. Rowe, Indian Runner	21	696
8	C E Close, Indian Runner	36	678
9	Aveley Poultry Yard, Indian Runner	53	666
10	Ericville Egg Farm *Buff Orpington	67	633
11	Bon Accord, *Buff Orpington	83	650
12	E A Newton, Indian Runner	48	649
13	C W Johnson, *Indian Runner	49	643
14	G Stead, *Indian Runner	58	636
15	J B Pettit, Indian Runner	60	613
16	S Craig, Indian Runner	59	609
17	F Piaggio, Buff Orpington	57	598
18	J R Parkes, Indian Runner	15	596
19	Mrs L Mellen, *Indian Runner	4	592
20	Perth Poultry Yard, *Buff Orpington	53	578
21	W Snowden *Buff Orpington	39	572
22	Sargenfri (S A), *Buff Orpington	63	480
	Total	1 141	14 475

THE TABLE POULTRY MARKET

The following interesting article on the English table poultry market is taken from the *Feathered World*

If I were asked by a farmer or someone who was contemplating utility poultry keeping whether eggs or table poultry paid the better, I would certainly recommend eggs, but this not because the profit from eggs is greater, but because the successful production of table poultry requires more expert knowledge This knowledge a very small proportion of poultry-keepers possess, and yet almost all of us have at one time or another fowls to sell for table, and it is worth pointing out how these should be dealt with so as to obtain the best possible market prices.

Though treating the subject generally, I am more immediately concerned with the London poultry markets—that is, Leadenhall and the

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* Male birds were placed in these pens on August 1.

Central. London absorbs a great deal of poultry grown in this country, the consigners being of two classes, the regulars and the irregulars. The latter are a very large class who send up their surplus stock, usually of second-rate quality; this fetches a very poor price, not enough in many cases to pay the growers, and yet they continue to send them, the only plausible explanation of this conduct being that they keep no accounts, and do not realise that they are making a loss over their fowls.

If people consign poultry to London they must conform to market conditions, and these, as everyone knows, or ought to know, are that all young poultry are sent plucked and shaped, but not drawn. "Old hens"—*i.e.*, cast and weeded out stock—are invariably sent alive. There is quite a large market in these latter, and are all bought by Jews, whose religion enjoins them to have their meat killed by a co-religionist and in a certain way. Yet not long ago I was shown a hamper of fowls which at a casual glance looked to be fine fatted chickens, but nearer inspection showed the birds were over two years old. The consigner knew his trade sufficiently to fatten, pluck, and shape them in the best manner, and yet was not aware they ought to have been sent alive. Had he done the latter they would have fetched quite 2s. each; as it was the salesman was doubtful if they would fetch 1s. 6d. "Ignorance, pure ignorance," as Dr. Johnson said on a certain celebrated occasion; but the ignorance cost the owner of these fowls dear.

Many consigners lose 6d. and 9d. a bird because they do not know how to prepare poultry for market. Plucking is not a difficult feat, but, like everything else, it has to be learned, and poultry plucked for the London market should be done by an expert. A fowl should be clean picked up to the neck and then "stubbed"—*i.e.*, the stumps of new feathers removed with a knife. On fattening establishments pluckers and stubbers are distinct, the one handing the bird over to the other. If the flesh is torn the tear should be sown up with a needle and thread, as a badly plucked and torn carcase looks very unattractive.

In fattening establishments the plucker, as I have said in the last paragraph, is also the killer. Practically all the fowls that come to London have had their necks dislocated; this is the most humane and cleanly way of all. The operator takes the bird in his left hand, gathering legs and wing-tips together, so that the fowl is absolutely helpless, then—he is seated at the time—he takes the bird's head in his right hand and, stretching the neck over his knee, gives a slight, steady pull, which tears the head from the neck, although the skin of the latter still holds the head attached to the carcase. Not a drop of blood is shed openly, though some drains into the cavity between head and neck. A fowl plucks better warm; it plucks best of all if the carcase is scalded, as the feathers then come away at a touch, but this must never be done for the London market.

All table fowls should be shaped, as then they present a better appearance. In France poultry are exposed for sale back uppermost, but here breast uppermost, and the body should look as square as possible; this square appearance is attained by subjecting the fowl for some hours, when the bodies are yet warm, to the shaping press. The press consists of a trough composed of two boards placed so as to form a V, the back board being rather narrower than the other; the front board should be about 6in. wide and the back 5in. The troughs are usually about 3ft. in length, and placed in tiers. The birds are laid in the trough breast downwards, the heads hanging down in front, the legs and wings tucked in close to the sides. They are packed close to each other till the trough is full, and then a board is laid on the top—*i.e.*, on their backs—and weighted with a heavy stone; the fatter the fowl, the squarer it comes out of the press after six or eight hours, and in all cases the appearance is improved.

Only the other day I was shown a consignment of fowls from Ireland ruined by bad packing; they had been put pell-mell into a hamper with hardly any straw, and many of the carcases were bruised. Hampers should be used for sending fowls to market, and the birds packed in sweet straw, so that they cannot bruise each other.

Every summer poultry consigners lose large sums owing to the heat. This is not altogether preventible, but in many cases not sufficient care is taken to make the carcases keep as long as possible. Fowls should be fasted twenty-four hours before they are killed; this empties the crop—a very important point, for if there is any food in it the fowl goes bad in a few hours in summer. Finally, they should be quite cold before they are put in the hamper. What they really want in summer is two or three hours in a refrigerator, but as the latter is not attached to farmhouses the poultry-keeper must do the best he can by putting the carcases in as cool a place as possible while cooling. Thorough fasting, thorough cooling, are the two golden rules for the fattener to keep in mind.

So much for the treatment of the dead fowls, which is partly responsible for the poor prices many consignments make, but the best of preparation would be wasted on many of the fowls that come to market. In point of fact, the quality of them, out of Sussex, is very poor. Few are properly fatted, most are half-fatted—that is, receive some sort of preparation for market, but are not crammed- and some, by their appearance, have received no preparation at all.

It must be confessed that the British poultry-keeper who breeds for market is handicapped, compared with the American or Continental man. Fowls here must be big, and there is no encouragement to kill them young; *petits poussins* are not in demand, nor the "broiler" so popular in the States; the very youngest fowl sent up here will be four months old, and few will be as young as that. Now the price fowls fetch most weeks of the year varies between 1s. 9d. and 5s., and, I repeat, I cannot understand, seeing the prices some fowls fetch, and the age they are, how their owners make them pay; they certainly cannot if the food the bird eats is all charged for.

The occasional consigner of table poultry to London should bear these facts in mind: That among the light breeds no good purpose is served in keeping them after three months old. Market the cockerels then, whatever their condition; the pullets, of course, of such breeds as Leghorns, Anconas, Campines, etc., do not pay to breed for table, but we must breed for stock, and we are bound to get superfluous cockerels. Among the heavier breeds the best for table are the Sussex, the Dorking, the buff Orpington, the Faverolles, and the Game. The market likes a big white-fleshed, white-legged, square-bodied fowl; black legs, for no reasonable cause, are not liked, neither are yellow-fleshed fowls; neither the Wyandotte, nor the Plymouth Rock, both so popular as table fowl in the United States, are appreciated here.

As to the general tendency of things, the outlook is not bright, foreign competition is getting very serious, and prejudicially affecting prices. Luckily, frozen fowls are never quite so good as the best British, and the only thing for our breeders to do is to improve the general quality of the fowls sent up for sale. Thus, and thus alone, will prices be maintained.

ENTOMOLOGICAL NOTES.

WORK FOR THE MONTH.

By L J NEWMAN.

During the month the following parasites have been distributed:—Black Scale, 10 colonies; Brown Scale, 10 colonies; Red Scale, 11 colonies; Cabbage Aphis, 3 colonies; Ladybirds, 6 colonies. Total, 40 colonies.

Most of my time this month has been taken up assisting Mr. Compere. We have carried out several experiments for trapping the fruit fly, and have found the kerosene the most effective, and at the same time not harmful to other beneficial insects, it having a peculiar attraction for the fruit fly.

A number of the female flies so caught have been examined, and found to contain a large number of eggs.

On the 4th of the month, per the "Orontes," a package of parasitised material was received from Mr. Compere, and so far with the following results:—*Red Scale parasites* (two species), 20 liberated on plant well infested with red scale, Government Gardens. *Lecanium cymbiforme* (two species), 52 have bred out and been liberated in various gardens around Perth, and from this same material I hope to get a still further supply.

This parasite is also a heavy worker on the soft brown scale and will, if established, be a very welcome addition to what we already have.

A consignment of scale feeding ladybirds was also received from California, which arrived in fair condition, and were liberated, 60 strong, in Chinese gardens, West Perth.

During the month, two packages of black scale parasites were forwarded to Inspector Vaughan, Albany; I have not heard from him with what results, but Inspector Breen tells me that a large number bred out and were liberated, and in one instance, to his knowledge, they have established themselves in Albany, he having seen the punctured scale.

The consignment of scale received from Sir Edward Holroyde, Victoria, has yielded no parasites, and on examination of the scale, a large percentage was found to have been parasitised, but these in turn had been attacked by a small mite which appears to destroy the parasite. I showed same to Mr. Compere, and he says it is a species of mite similar to that which attacked the larvæ of the *Scutillista cyanea* in California. The material was forthwith destroyed by burning, and specimens mounted for future comparison.

TURKEY AND GENERAL POULTRY FEEDING.

The following are the most salient portions of the paper on the feeding of turkeys and poultry generally, read by Mr. J. B. Petitt at the second annual conference of the Sussex District Settlers' Association recently and published in the columns of the *West Australian*:—

Mr. Petitt said that in raising turkeys there were two very important things to attend to. First, to get good breeding stock, and second, to feed the young turkey chicks properly, and keep them free from small mites. In selecting birds for breeding the first consideration was to secure a pure breed, whether for home use or market. It would be cheaper in the long run to breed from the best strain one could get. The farmer might secure a fairly satisfactory return from a flock of common barndoor hens, but, if he imagined he could do the same with a flock of common turkeys, he would be woefully mistaken. This was the chief reason that so many people were so unsuccessful with their turkeys. When buying turkeys for breeding, care should be taken to see that they were not related in any way. To do this it was as well to buy from farmers at a long distance from each other. Size should not be the only recommendation. The medium size, square-bodied bird was the best to lay the foundation of a flock with. Most people tried to buy the largest birds they could, but it would be found that the birds with square bodies and breasts, strong, stout legs, and general good form would fetch more money, whether for table use or for breeding. One gobbler to every eight or ten hens was the best average. For breeding, turkeys were best mated at three years for the gobblers and two years for the hens. Gobblers did not reach maturity until they were about thirty or thirty-five months old, nor hens until they were two years of age. If breeders kept to these ages, they would find the chicks would be much stronger than those from any other mating. A turkey hen laid from eighteen to twenty-four eggs. The best way was to place the first eight eggs under a common hen, and let the turkey hatch the rest. The turkey hen was a model sitter and nearly always sat too close for her own health, starving herself till, when her chicks hatched, she was almost too weak to mother them. A turkey hen would generally try to steal her nest—that is, to lay away and hide it. He believed it was better to let them make their own nests; but they should be found, and, as he had said, some of the eggs removed. Whole maize was the best feed for a sitting turkey. As soon as the chicks were hatched, they should be brought in and locked up in a yard every night, as, if left to the mother, she would drag them all over the paddock in search of food at daylight in the morning, without the least regard to the wet grass, which soon killed them. Turkeys in their wild state were never found in any large number where it was wet; they were only found on the sand plains and scrub, where there was no wet grass in the morning. In regard to the best feed for the young chicks, take crushed maize two parts, oatmeal one part, or crushed rye one part, bran and pollard one part, with two parts of eschalots, nettles or onion tops mixed very dry, and feed sparingly. More turkeys were killed from over-feeding than died from being under-fed. On no account give them bread. With regard to mites, these little pests attacked the chicks at the back of the head, and unless something was done, the chicks died off one by one. The best way was to keep a bottle of mite-killer, and paint the backs of their heads as soon as hatched. This should be repeated once a week for three weeks, after which the mites had not so much power over them, and they were better left to themselves.

In feeding poultry the most important thing was to get the largest return from the smallest amount of food—that is, for eggs. They must feed a properly-balanced ration, or endeavour to do so. As however, he was dealing with farmers whose poultry were supposed to be running at large, they would take them to be about twelve months to two years old. Old fowls were not worth feeding. Taking the present season of the year for starting (as a different season of the year required different feeding ration), equal parts of bran and pollard, or crushed wheat, which was the same thing, with half the bulk of cut green stuff, lucerne, if not almost any green stuff, chopped fine. If one had not a machine to cut it with, a tomahawk would do, or one could make a machine like a tobacco-cutter, which would cost about 1s. 6d., and would chop enough green stuff in two minutes for a hundred fowls. Give this first thing in the morning, and give it regularly—not early one morning and late the next. Have a stated time to feed the fowls. Three days a week crushed maize should be given, in the proportion of one-third of the measure of bran and pollard, and two days a week some animal food should be given, in either meat or blood, fresh or dried, it mattered little, in the proportion of about one ounce per bird each time. Then feed at five in the evening, with a variation of the following:—Grains: Wheat, rye, oats, and maize, giving maize and rye twice to wheat and oats once. For instance, make a start on Monday with maize; Tuesday, wheat; Wednesday, rye; Thursday, maize; Friday, oats; Saturday, rye; Sunday, maize; then starting the following Monday with wheat. There were two reasons for giving maize and rye more than wheat and oats. One reason was that every farmer in that district grew them better than either wheat or oats, and cheaper, and again, they were better for egg-producing for at least the next six months, after which they would need less maize and more rye. Of course, later on, when there was plenty of green feed, it would not be necessary to feed so much bulk, as the hens will be able to get it themselves, but it was better to give some all the year round, considering it was cheap. Some farmers would no doubt think this was feeding hens on luxuries, but, if they would place themselves on a ration of dry bread for a week, they would then form an idea what it was to feed fowls on the one food from year's end to year's end. It would perhaps be asked why fowls required a variation of food. In the first place, take the wild birds. They only laid in the spring-time. Why? Because at that season of the year they could get insects of all descriptions —grasshoppers, worms, etc.—which gave the proper ration for egg-forming and then they got a variety of seeds suitable for rearing the young and egg-forming. Nature had provided for this; therefore, to ask fowls to lay all the year round, they must make it spring all the year round with their food. As the cold weather was coming very soon, they would have to provide a ration containing more carbo-hydrates than during the past few months. To do this you will have to know the analysis of the different foods. The cost of raising a dozen eggs in a suburban town was about 6½d. For a farmer to get a dozen eggs, after paying all expenses from the time the chickens were hatched until he got the dozen eggs, would be about 2½d. This left a profit of 9½d. a dozen. A farmer with 100 fowls, if they were properly fed, should, at the lowest, get 800 dozen eggs. Put them at 1s. per dozen, £40; 2½d. a dozen from that left a net profit of £31 13s. 4d. The price of three good cows.

LOCAL MARKET REPORT.

Weekly market report of the W.A. General Produce Company, 245 Murray Street, Perth, of sales effected for the following articles month ending Wednesday, April 10, 1907 :—

Business during the past month, previous activity well maintained, supply fairly plentiful of farm and orchard produce. Detailed particulars as follows :—Bacon selling well, values remain firm, with prospect of slight rise; hams, regular sales confined to well known brands; butter, supplies fairly good, importations from Victoria and New South Wales, values are quite firm, with a likelihood of Victorian rising; cheese continues selling well, values unaltered; eggs, large numbers are being imported continuously from South Australia, local fresh laid, reliable lots find good outlet; potatoes, full supplies of imported are in many instances selling under cost; onions fairly plentiful, values very low, Miller's lines continue firm, and likely to rise substantially very soon; fruit, large supplies of apples on market, in many instances of inferior quality and values are very depressed, and even affecting the few lots of good quality; grapes ridiculously cheap: vegetables continue being short, and values have been and continue to be very remunerative for the growers; poultry stocks plentiful, demand rather poor just now; carcase pork in good demand.

Farm and Dairy Produce.—Bacon, Hutton's 10d., Newman's 9d. per lb.; hams, Hutton's 1s. 1d. per lb.; butter, Euroa 1s. 1d., Mihwa 1s. 0½d., Hansen 1s., Myrtle 11½d., Wilby 11½d. per lb.; lard in 1 lb. pats 7½d.; cheese, medium 7d., loafs 7½d. per lb.; eggs, local 1s 9d. to 2s. 2d. per doz.; potatoes, Tasmania £5 to £5 10s., local £3 10s to £6 per ton; onions, 5s. 6d. per cwt.; chaff, £2 5s., £3 to £3 17s. 6d. per truck lot; bran, £5 10s. per ton; pollard, £5 12s. 6d. per ton; flour, local sacks £8, quarters £8 5s. per ton; oats, white, 3s. 6d., Algeron 3s. 3d. per bushel; maize, whole, 4s. 6d. per bushel; wheat, 3s. 3d. truck lot; oil cake, £8 10s. per ton.

Fruit.—Oranges, Italian, 22s. 6d. per case; lemons, local, 6s. 6d. to 7s. 6d. per case; passion fruit, 6s. to 10s. per case; grapes, Doroadilla 2s. 6d. to 4s. 6d., Wortley Hall 5s. 9d. to 9s., Muscat 3s. 6d. to 6s. per case; peaches, from 5s. to 12s. 6d. per case; pears, dessert 8s. to 15s., cooking 3s. 6d. to 5s per case; apples, Jonathan 5s. 6d. to 10s. 6d., Cleopatra 6s. to 7s. 6d., mixed sort 3s. 6d. to 5s., inferior quality 1s. 9d. to 2s. 6d. per case; pears, 5s. 6d. to 9s. per case; quinces, 2s. 6d. to 4s. 6d. per case; melons, water, 3s. 6d. to 7s. 6d. per doz.

Vegetables.—Cabbage from 5s. to 14s. 6d. per cwt.; carrots, 1s. to 1s. 9d. per doz. bunches; parsnips, 1s. to 2s. per doz. bunches; turnips, white, 1s. 6d. to 2s. 6d. per doz. bunches; turnips, Swedes, bulk, £4 to £5 per ton; beans, French, 1d. to 2½d. per lb.; peas, green, 3d. to 4d. per lb.; marrows, 2s. to 3s. 6d. per doz.; pumpkins, ironbark 5s. to 8s. 6d., bugle 4s. to 5s. 6d.; rhubarb, 1d. to 2d. per lb.; Chilies, 3d. to 4½d. per lb.

Salads and Herbs.—Lettuce, 1s. to 2s. per quarter bag; spring onions, 3d. to 4d. per bundle; beetroot, 9d. to 1s. 6d. per doz. bunches; cucumbers, 1s. to 2s. 6d. per dozen; tomatoes, 2s. 6d. to 7s.; celery, 1s. to 3s. 6d. per doz. heads; cress, 1s. per dozen bunches; radishes, 8d. per doz. bunches; thyme, marjorum, and sage, 2s. 6d. per tray; mint and parsley, 4d. per bundle.

Poultry (for killing).—Fowls, prime table 4s. to 5s. 6d. per pair, hens and mixed lot 3s. to 4s. 6d.; chickens, 2s. 6d to 3s. 6d. per pair; ducks, 4s. to 6s. per pair; geese, worth 7s.; turkeys, gobblers, large 14s. 6d. to 20s., hens, large 7s. to 9s.

Game.—Black duck, worth 2s. 6d. per pair; teal, 1s. 6d. per pair; wood duck, 2s. per pair; hardhead and bluewing, 2s. per pair; mountain duck, 3s 6d. per pair.

Carcase Meat.—Pork, medium weight, 5d. to 6d. per lb.; lamb, frozen, 4½d. to 5d. per lb.; frozen mutton, 4d. to 4½d. per lb.

Sundries.—Corn sacks, 5s 6d. second hand; bran bags, 3s. 6d. second hand; bonedust, £7 10s. per ton; phosphate, £5 10s. per ton; guano, ammonical £5 10s., phosphatic £4 10s.; ammonia, 20s. per cwt.; nitrate of potash, 17s. per cwt.

GARDEN NOTES.

By G. Chitty Baker.

The weather from all appearance at the time of writing promises to continue warm and dry for some time yet. Last year it will be remembered the rains did not commence until the 22nd May, but we may expect it earlier this year. The sowing of seed, therefore, is very precarious unless there is a good supply of water to germinate and keep the young plants going. All spare ground should be well worked, digging in plenty of good stable manure—the sort that is made when liberal bedding has been supplied; this must be well rotted. If there is any to spare, make it into one or two good sized heaps, cover over with iron or something to keep the rain out when it comes. This will come in very useful next month (June) for making up forcing beds for early cucumbers and tomatoes

Broad Beans.—Another good sowing of these may be made. Those sown in April should be well advanced if they had been supplied with moisture. Keep the ground well stirred between the rows, in order to receive the rain and also keep down all weeds. Seed should be sown 3in. deep, 6 to 9 inches apart, in rows 5 to 6 feet apart, using the centre of the rows for some quick-growing salading. When the rows run north and south, potatoes may be planted in between, early crops often being obtained this way in this State.

Beans, French.—Seed may be sown only in the northern or warmer portions of the State. It will take them from nine to ten weeks before there are any beans fit to pick, at this time of the year; and if the weather becomes very cold, the crop will not pay for the sowing.

Beet.—Seed may be sown of both the turnip and long varieties. For small or private gardens the turnip is certainly the best. Sow two or three seed half an inch deep every 6 to 8 inches, thinning out afterwards to a single plant.

Beet, Silver.—Plant out any young seedlings on the first dull day. Seed may be sown for succession. Keep growing plants free from weeds.

Brussells Sprouts.—All planting out should be finished this month, and young plants kept growing by watering with a little liquid manure. For those who are unable to obtain fowls' droppings, which make the best liquid manure, the following will be found a good substitute:—Half a pound of sulphate of potash, half a pound of sulphate of ammonia, and three-quarters of a pound of superphosphate mixed and used at the rate of two ounces to the gallon of water. Do not let the mixture go over the leaves. A second watering with clear water will be found advantageous.

Cabbage.—Sow a few seed of a late kind for succession; keep young plants growing, and plant out seedlings as they come on.

Cauliflower.—The remarks made in regard to brussells sprouts are applicable to this vegetable.

Carrot.—Seed may be sown extensively this month, either in drills or beds. Drills are certainly the best, as weeding is so much easier. Good shape roots can only be obtained in ground that has been liberally manured for a previous crop.

Leek.—This very valuable vegetable is not grown as much as it deserves. For stews and soups it has no equal, and also supplies the best of green food, when cut up fine, for young chicks or ducklings. Seed may be sown in a bed, and when large enough to handle, transplanted into well-manured ground.

Lettuce.—Continue sowing for succession, transplanting as required.

Endive is often grown as a substitute for lettuce, and is preferred to lettuce by some people. They both require the same cultivation.

Onions.—Seed may be sown as for leeks. No very great advantage is gained by large sowings, as those made later on in early spring, owing to the better heart the soil is in, soon catches up to those planted early. For spring onions and salads, however, now is the proper time to sow, either in beds or drills.

Peas.—All early sorts can still be sown, the dwarf kinds in preference. Next month (June) is soon enough for the second earlies.

Parsnips.—Sow a few for succession.

Radish.—Seed should be sown to keep up a supply. This is applicable to all salading plants.

Turnips.—Continue sowing. The seed "Orange Jelly" should be tried wheie it has not been grown before.

Weeds.—Too much importance cannot be attached to the keeping clear of weeds all growing plants. If neglected the weeds soon get ahead of the plants which accordingly suffer.

STOCK & MACHINERY FOR SALE.

Narrogin State Farm.

STOCK.

HORSES.

Name.	Colour.	Sex	Class.	Age.	Price.	Pedigree.
JACK ...	Bay	Gelding	Draught	Aged	£25	
NUGGET ...	Bay	Gelding	Draught	5 yrs.	£30	
DOLL ...	Bay	Mare	Draught	5 yrs.	£40	Colt foal at foot by Prince Royal, and served by Prince Royal.
BESS ..	Black	Mare	Draught	Aged	£30	
MAUD ...	Bay	Mare	Draught	5 yrs.	£30	Filly foal at foot.
NELLIE ...	Bay	Mare	Draught	5 yrs	£30	Served by Prince Royal.
METTLE ...	Chestnut	Mare	Suffolk	7 yrs.	£80	Bred by Dangar Bros. Colt foal at foot by Queastor. Served by Boulge Pluto.
CRISP ...	Chestnut	Mare	Suffolk	Aged	£60	Bred by Dangar Bros. Colt foal at foot by Queastor.
STATELY 2ND	Chestnut	Mare	Suffolk	Aged	£60	Bred by Dangar Bros. Filly foal at foot by War Dance.
LEADER ...	Chestnut	Mare	Suffolk	Aged	£35	Bred by Dangar Bros. Served by Boulge Pluto.
DAMSEL ...	Chestnut	Mare	Suffolk	Aged	£30	Bred by Dangar Bros. Served by Boulge Pluto.

The above horses are all good workers and thoroughly quiet.

CATTLE—Ayrshire.

AYRSHIRE COW ... ... ANNA.

Bred by Mr. T. A. GRANT, "Glen Elgin," Victoria.

Colour, Brown and White. Calved November 20th, 1899.

Sire—GORDON.

Dam—ANNIE LAURIE OF GLEN ELGIN (16 A.H.B.), by Ada's Earl of Oakbank.

G.-Dam—Annie Laurie II., of Oakbank (1 A.H.B.), by 21st Duke of Barbiston (26 A.H.B.).

2nd G.-Dam—Annie Laurie of Oakbank (8 A.H.B.), by Southern Chief.

3rd G.-Dam—Annie Laurie (7 A.H.B.), by Rival of Drumlanrig (78 A.H.B.).

4th G.-Dam—Dinan, by Dunlop (25 A.H.B.).

5th G.-Dam—Katie II., by Rob Roy (79 A.H.B.).

6th G.-Dam—Katie, by Old Rob Roy.

7th G.-Dam—Mollie, by Bob.

8th G.-Dam—Maggie, by Bob.

9th G.-Dam—Annie (imported).

SALE PRICE, £12 12s.

Stock and Machinery for Sale—*continued.*

AYRSHIRE BULL . . BONNIE JACK.

Bred by DEPARTMENT OF AGRICULTURE.

Colour, Red and White. Calved 4th December, 1901.

Sire—BONNY JOCK.

Dam—LADY LOUISA II.

SALE PRICE, £8 8s.

AYRSHIRE COW .. ... LADY LOUISA II.

Bred by ANGUS McNAB, Esq., "Victoria Bank," Tullamarine, Victoria.

Colour, Red and White. Calved 1st September, 1896.

Sire—NETHERCRAIG.

Dam—LADY LOUISA by Carlisle (17 A.H.B. of A.).

G.-Dam—Princess Louisa (289 A H.B.) by Duke of Barbiston 15th.
2nd G.-Dam—Louisa 6th (581 A H B.) by Lord Ronald (57 A.H.B. of A.).
3rd G.-Dam—Louisa II. by Highland Laddie
4th G.-Dam—Louisa by Old Rob Roy.
5th G.-Dam—Polly by Geelong Billy
6th G.-Dam—Nellie by Nelson
7th G.-Dam—Mollie by Bobbie.
8th G.-Dam—Annie (imported)

SALE PRICE, £12 12s.

AYRSHIRE COW GLEN ELGIN'S QUEEN.

Bred by the DEPARTMENT OF AGRICULTURE

Colour, Red and White. Calved 27th of October, 1901.

Sire—GLEN ELGIN'S HERO.

Dam—ANNA (see pedigree)

SALE PRICE, £10 10s.

AYRSHIRE HEIFER .. LADY LOUISA III.

Bred by the DEPARTMENT OF AGRICULTURE.

Colour, Red and White Calved 1st September, 1905.

Sire—PEVERILL (imported).

Dam—LADY LOUISA II (see pedigree).

SALE PRICE, £10 10s.

AYRSHIRE HEIFER . . LADY LOUISA IV.

Bred by the DEPARTMENT OF AGRICULTURE.

Colour, Red and White. Calved 24th August, 1906.

Sire—PEVERILL (imported).

Dam—LADY LOUISA II. (see pedigree).

SALE PRICE, £10 10s.

Stock and Machinery for Sale—*continued.*

AYRSHIRE HEIFER ... ... **ANNA II.**

Bred by the DEPARTMENT OF AGRICULTURE.

Colour, White, Red Spots. Calved 15th June, 1906.

Sire—PEVERILL (imported).

Dam—ANNA (see pedigree).

SALE PRICE, £10 10s.

AYRSHIRE HEIFER ... ... **QUEEN.**

Bred by the DEPARTMENT OF AGRICULTURE.

Colour, White, Red Spots. Calved 21st June, 1906.

Sire—PEVERILL (imported).

Dam—GLEN ELGIN'S QUEEN (see pedigree).

SALE PRICE, £10 10s.

GRADE CATTLE.

Name.	Breed.	Colour.	Sex.	Age.	Sale Price.	Remarks.
PATSEY	Grade Dexter	Black	Cow	4 yrs.	£8	Milch Cow
NORAH	Grade Dexter	Black	Cow	4 yrs.	£8	Milch Cow
RUSTY	Grade Dexter	Black	Cow	4 yrs.	£8	Milch Cow
NEGRESS	Grade Dexter	Black	Cow	4 yrs.	£8	Milch Cow
FAIRY	Grade Ayrshire	Red and White	Cow	7 yrs	£8	Milch Cow
GIPSY	Grade Jersey	Fawn	Cow	7 yrs.	£8	Milch Cow
SUSAN	Ordinary	Red and White	Cow	6 yrs.	£6	Milch Cow
4 Head	Ordinary		Heifers	1 to 1½ yrs.	£4	
5 „	Ordinary		Steers	1 to 2 yrs.	£3	
2 „	Grade Dexters		Heifers	4 mths.	£3	

PIGS—Berkshire.

BOAR ... ... **GENERAL TOGO.**

Bred by A. J. SAUNDERS, Esq.

Colour, Black with White markings. Farrowed 5th December, 1903.

Sire—SAN TOY (imported), by Federated.

Dam—SILVER BELL (imported).

G.-Dam—Primrose.

2nd G.-Dam—Countess

SALE PRICE, £6 6s.

BOAR ... ... **ADMIRAL TOGO.**

Bred by the DEPARTMENT OF AGRICULTURE.

Colour, Black with White markings. Farrowed 5th November, 1905.

Sire—GENERAL TOGO, by San Toy (imported).

Dam—THE NUN, by The Friar (imported).

G.-Dam—Broughton's Pet.
2nd G.-Dam—Lady Broughton.
3rd G.-Dam—Princess Royal.

SALE PRICE, £5 5s.

Stock and Machinery for Sale—*continued.*

3 SOWS—Nos. 58, 59, 60, ear tag.

Bred by the DEPARTMENT OF AGRICULTURE.

Colour, Black with White markings. Farrowed 5th November, 1905.

Sire—GENERAL TOGO, by San Toy (imported).

Dam—THE NUN, by The Friar (imported).

G.-Dam—Broughton's Pet.
2nd G.-Dam—Lady Broughton.
3rd G.-Dam—Princess Royal.

SALE PRICE, £3 3s. each.

4 BOARS (6 months old).

Sire—GENERAL TOGO.
Dam—THE NUN.

SALE PRICE, £3 3s. each.

4 BOARS (3 months old).

Sire—GENERAL TOGO.
Dam—JUDITH.

SALE PRICE, £2 2s. each.

4 SOWS (6 months old).

Sire—GENERAL TOGO.
Dam—THE NUN.

SALE PRICE, £3 3s. each.

PIGS—Middle Yorkshire.

Colour, White.

3 BOARS, 12 months old (imported from Victoria).

SALE PRICE, £10 10s. each.

IMPLEMENTS AND MACHINERY.

One 3-Furrow Disc Plough (Benecia Hancock)	Sale Price, £12
One 3-Furrow Disc Plough (Spalding Robbins)	Sale Price, £8
One 2-Furrow Sulky Plough	Sale Price, £4
One Seed Drill (Buckeye)	Sale Price, £15
One Reaper and Binder (Massey-Harris)	Sale Price, £15
One Oil Engine (Victory), eight h.p.	Sale Price, £45
One Tread Power (Gray & Sons) ... One Threshing Machine (Gray & Sons)	Sale Price, £20

Stock and Machinery for Sale—*continued.*

Chapman State Farm.

STOCK.

HORSES.

No.	Sex.	Age.	Breed.	Brand.	Price.		
					£	s.	
1	Mare	18 years	Suffolk	$^{2}\frac{1}{5}{}^{3}$ near ribs	12	0	0
1	,,	16 ,,	,, ...	$^{2}_{0}{}^{\prime\prime}$ near ribs ; HD (conjoined) near s.	15	0	0
1	,,	15 ,,	Clydesdale ..	RG near s.	15	0	0
1	,,	11 ,,	,, ..	JD ,, ...	17	0	0
1	,,	14 ,,	,, ...	T ,, ...	14	0	0
1	,,	18 ,,	,, ..	JT ,, ...	10	0	0
1	,,	18 ,,	,, ..	TD near ribs	12	0	0
1	Gelding	15 ,,	Hack	CO near s.	5	0	0
1	,,	14 ,,	,, ...	AC near rump	5	0	0
1	Mare	7 ,,	,, ...	29 near s.	6	0	0
1	Gelding	2½ ,,	Medium Draught	C ↑ ,, ...	8	0	0
1	,,	2½ ,,	Hack ...	C ↑ ,, ...	3	0	0

CATTLE.

No.	Breed.	Sex.	Age.	Pedigree.	Where Bred.	Price.		
						£	s.	d.
1	Dexter	Cow	7 yrs.	Imported from Victoria, bred by David Syme	Victoria	8	0	0
1	,,	,,	4 ,,	Farm bred, dam, David Syme cow, by Dexter bull Derry	Chapman Farm	10	0	0
1	,,	Bull	18 mths.	Dam, David Syme cow ; sire, Derry (imp.)	,,	10	10	0
1	,,	,,	9 ,,	Dam, Dahlia 2nd (imp.); sire, Jolly Jim (imp.)	,,	10	10	0
1	,,	,,	9 ,,	Dam, Bluebell (imp.); sire, Jolly Jim (imp.)	,,	10	10	0
1	,,	,,	9 ,,	Dam, Daisy (imp.); sire, Jolly Jim (imp.)	,,	8	8	0
1	,,	,,	9 ,,	Dam out of David Syme cow (imp.); sire, Jolly Jim	,,	8	8	0
1	Cross-bred	Cow	4 yrs.	... ...	...	5	0	0
1	,,	,,	6 ,,	... ...	...	5	0	0
1	,,	,,	6 ,,	... ...	...	5	0	0
1	,,	,,	5 ,,	... ...	...	5	0	0
1	,,	,,	7 ,,	... ...	...	5	0	0
1	,,	,,	7 ,,	... .	...	5	0	0

Stock and Machinery for Sale—*continued.*

PIGS.

No.	Age.	Breed.	Pedigree.	Sex.	Price.		
					£	s.	d.
24	5 months	Large Black	Pure Bred	Sows, each	1	10	0
4	18 „	„ „	„ „	„ „	2	10	0
1	9 „	„ „	„ „	„ ...	1	10	0
1	18 „	„ „	„ „	Stud Boar	5	10	0
4	12 „	„ „	„ „	Boars, each	2	10	0
8	5 „	„ „	„ „	„ „	1	10	0
1	3 years ...	Large Black, Julia	Sire, Liberton Black Boy; dam, Black Bess	Sow ...	3	10	0
1	3 „ ...	Large Black, Judith	Sire, Liberton Black Boy; dam, Black Bess	„ ...	3	10	0

ANGORA GOATS.

No.	Age.	Sex.	Price.			No.	Age	Sex.	Price.		
			£	s.	d.				£	s.	d.
3	12 months	Does	2	2	0	4	Aged	Does	2	2	0
4	7 months	„	2	2	0	1	4 months	„	1	1	0
1	2 years	„	2	2	0	3	6 months	Bucks	3	3	0
1	3 years	„	2	2	0	4	7 months	„	3	3	0
3	4 years	„	2	2	0	5	7 months	„	3	3	0

MACHINERY.

		£	s.	d.
Two 3-Furrow Disc Ploughs (Benecia)	each	13	0	0
One 3-Furrow Disc Plough (Heavy Spalding Robbins)		10	0	0
One Seed and Fertiliser Drill		16	0	0
One 2-horse Tread Power One Thresher (Gray & Sons)		16	0	0
One Reaper and Binder (Massey-Harris)		18	0	0
One Corn Grinder		3	0	0
One Header		4	0	0
One Buckboard		13	0	0
One Oil Engine		45	0	0

NOTES ON THE CLIMATE FOR THE MONTH OF MARCH, 1907.

The feature of the month was the heavy general rain that fell throughout nearly the whole of the State. Commencing in the Kimberley district on the 6th, it gradually worked down the North-West coast, and on the 13th there were signs of a "low" off the North-West Cape. Next day this was more pronounced, the minimum barometer at Onslow being 29.319. On the 15th the centre reached Shark's Bay, and the disturbance moved steadily overland towards the head of the Bight, which it reached on the morning of the 18th. During its passage the barometer fell to 29.242 at Yalgoo, and 29.282 at Cue, this being considerably lower than any previous record at these places. Heavy rain accompanied the disturbance, two, three, and four inches being recorded in the North-West on the morning of the 15th, and very nearly as heavy over the Murchison and Coolgardie Goldfields on the morning of the 16th. The South-Western coastal districts practically escaped the downpour, but a little was recorded there on the 27th. The pressure during the month was about normal in the Tropics, but considerably below in the South-West and a little below inland over the Goldfields. Temperatures throughout the State were about 2deg. below the average for previous years in the Tropics, and from 2deg. to 4deg. below on the Goldfields; in the South-West and South, however, the day temperatures were about normal, but the night from 2deg. to 4deg. above.

Owing to the disturbance before mentioned, the rainfall was considerably above the average for March over the whole of the State, except in coastal districts between Shark's Bay and Bunbury, where it was about normal.

W. E. COOKE,
Government Astronomer.

The Observatory,
Perth, 10th March, 1907.

The Climate of Western Australia during March, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						March, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
North-West and North Coast:	Wyndham	29·830	29·815	30·005	29·703	94·1	77·8	86·0	99·0	72·8	94·9	78·4	105·9	70·0	464	7	1833
	Derby	29·845	29·836	30·036	...	91·9	76·1	84·0	96·7	66·2	95·7	76·9	105 0	64·0	875	16	2167
	Broome	29·827	29·826	30·000	29·691	91·7	74·2	83·0	98·0	69·0	93·2	77·2	104·1	62·8	396	9	2077
	Condon	29·830	29·849	30·041	29·669	91·9	73·4	82·6	102·2	65·6	93·7	73·5	114·8	56·5	291	8	777
	Cossack	29 820	29·830	30·040	29·570	94·0	74 0	84·0	104·0	69·0	96·4	76·4	111·2	65·0	1498	8	1899
	Onslow	29·826	29·839	30·065	29·319	93·2	73·7	83·4	104 0	66·2	96·5	73·6	112·0	63·0	504	8	550
	Winning Pool ...	29·820	...	30·094	29 384	96·3	72·8	84·6	111·0	63·0	...	...	...	...	415	3	878
	Carnarvon	29·864	29 908	30·133	29 462	86·1	72·2	79·2	97·6	65·0	89·6	69·9	110·3	59·0	211	5	219
	Hamelin Pool... ...	29·844	29·898	30·105	29·428	92·9	70·2	81·6	104·6	60·8	95·1	67·3	112·8	50 6	35	1	63
	Geraldton	29·912	29·980	30·209	29·501	84·9	66·7	75·8	99·4	54·8	83·9	62·1	107·0	48·7	93	5	93
Inland:	Hall's Creek	29·852	29·872	30·053	29·718	93·2	69·7	81·4	98·6	56 0	93·2	71·4	104·0	51·8	277	5	1541
	Marble Bar	...	...	.	.	98·7	74·2	86·4	110·9	68·5	104·8	76·2	113·8	59·6	350	9	804
	Nullagine	29·830	29·861	30 030	29·700	98·0	70·4	84·2	106·0	61·4	96·4	71·5	111·0	54 9	392	7	579
	Peak Hill	29·855	29 882	30·050	29·500	90·0	69·0	79·5	108·0	61·0	93·4	69·5	103·2	52·8	385	7	448
	Wiluna	29·930	29·894	30 090	29·453	88·3	67·1	77·7	104·0	57·0	93·8	65 2	103·8	49·3	274	7	361
	Cue	29·866	29·929	30·124	29·284	91·2	69·1	80·2	107·8	55·0	94·1	66·8	108·2	49·5	201	3	418
	Murgoo	...	. .	...	..	92·3	69·4	80·8	105·0	58·0	. .	...	...	...	186	5	305
	Yalgoo	29·880	29·933	30·166	29·242	88·6	67·2	77·9	102·1	55 2	92 4	64·2	107·7	48·6	224	4	309
	Nungarra	..	...	...	...	86 2	64·8	75·5	103·0	53·0	...	...	...	...	321	5	350
	Lawlers	29 916	29·949	30·151	29·522	83 8	65 8	74·8	100·0	54·0	89·9	65·6	105·1	46·8	252	4	372
	Laverton	29·950	29·998	30·225	29·481	84·4	63·8	74·1	97·3	54·5	88·4	62·9	103·2	48·2	454	9	569
	Menzies	29·969	29·985	30·235	29 537	84·7	62·3	73·5	98·4	54·0	87·2	62·0	105·0	46 0	169	7	216
	Kanowna	...	...	...	. .	80·1	59·2	69·6	94·0	51·0	...	...	...	...	393	9	474
	Kalgoorlie	29·980	30·018	30·282	29·608	81·5	60·0	70·8	97·8	51·0	85·8	59·9	104·0	43·8	357	8	424
	Coolgardie	30·001	30·010	30·278	29·596	79·4	58·2	6·88	95·9	50·0	85·5	58·5	104·2	43·5	527	9	648
	Southern Cross ...	29·985	29·988	30·240	29·600	84·0	57·0	70·5	102 0	48·0	87·7	57·1	107·9	40·0	199	8	246
	Kellerberrin	...	...	...	...	...	...	..	..	...	...	...	...	...	130	6	165
	Walebing	...	...	...	...	86·4	60·6	73·5	103·4	51·2	89·8	58·1	104·9	40·4	109	7	233
	Northam	...	...	...	...	86·3	60 2	73·2	102·5	50·8	88·5	57·9	106·6	42·3	161	6	213
	York	29·994	30·017	30·265	29·719	85·9	59·7	72·8	103·2	50·0	86·6	55·9	105·2	41·1	76	6	119
	Guildford	...	...	...	...	86·4	61·5	74·0	107·2	49 3	86·4	57·9	105·8	42·8	26	3	87

The Climate of Western Australia during March, 1907—*continued.*

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month	March, 1907.					Average for previous Years.				Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
						Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded	Lowest ever recorded.			
South-West and South Coast:	Perth Gardens ...	29·964	30·026	30·218	29·659	84·1	63·3	73·7	102·2	53·9	84·0	60·6	104·0	45·4	51	6	103
	Perth Observatory	29·976	30·027	30·231	29·655	83·1	62·9	73·0	103·0	51·5	81·6	60·5	104·3	45·8	53	6	100
	Fremantle	29·982	30·034	30·226	29·708	81·0	64·4	72·7	99·5	54·2	78·6	62·2	100·1	48·3	46	6	106
	Rottnest	29·986	30·014	30·210	29·702	77·0	65·2	71·1	98·4	58·0	76·5	63·4	95·8	47·9	28	3	93
	Mandurah	...	...	...	...	82·5	60·5	71·5	99·0	47·2	81·8	57·3	99·2	38·8	25	4	55
	Marradong	...	...	...	...	...	...	...	...	...	...	..	...	...	92	3	125
	Wandering	...	...	...	...	81·8	54·7	68·2	97·5	40·8	83·5	48·5	102·2	30·9	156	4	211
	Narrogin	...	...	...	...	..	...	..	...	...	...	...	...	...	...	...	..
	Collie ...	...	...	...	...	81·7	53·4	67·6	102·0	41·2	81·2	49·2	100·8	32·3	114	3	134
	Donnybrook	...	...	...	...	81·1	55·6	68·4	101·5	40·0	81·4	52·4	99·9	33·0	160	5	235
	Bunbury	30·014	30·051	30·237	29·713	80·5	59·0	69·8	97·2	49·0	78·6	56·4	97·1	39·3	122	4	147
	Busselton	...	...	...	...	78·5	56·2	67·4	91·5	43·5	78·1	52·8	93·8	36·7	85	5	141
	Cape Naturaliste	30·014	...	30·239	29·705	74·5	58·9	66·7	88·0	52·2	...	...	...	...	121	4	239
	Bridgetown	...	...	...	...	80·3	50·9	65·6	100·5	39·1	80·5	45·4	100·9	31·2	135	4	230
	Karridale	30·015	30·062	30·220	29·700	78·0	56·0	67·0	99·0	45·0	74·9	54·5	101·5	39·0	237	7	307
	Cape Leeuwin ...	29·995	30·026	30·240	29·620	74·0	62·0	68·0	96·0	55·0	72·1	61·1	94·6	50·5	224	11	330
	Katanning	30·028	30·038	30·276	29·775	80·5	55·3	67·9	99·0	46·0	80·6	51·7	102·8	35·0	137	5	219
	Mt. Barker	...	...	...	...	75·8	52·9	64·4	98·0	42·0	...	...	...	...	254	9	398
	Albany ...	30·050	30·065	30·322	29·694	73·4	57·8	65·6	95·0	48·2	71·8	55·4	98·4	38·7	187	11	322
	Breaksea...	30·043	30·063	30·323	29·580	69·3	59·5	64·4	82·8	53·0	68·6	58·5	93·0	44·9	253	15	370
	Esperance	30·040	30·064	30·342	29·803	76·0	56·8	66·4	100·0	44·0	76·6	56·9	104·4	40·6	178	11	282
	Balladonia	30·056	30·084	30·332	29·661	76·7	55·5	66·1	89·4	46·0	81·2	53·0	100·0	38·1	310	10	439
	Eyre ...	30·012	30·081	30·265	29·571	75·2	56·7	66·0	90·0	41·0	77·1	56·4	105·0	38·2	365	6	405
						INTERSTATE.											
	Perth ...	29·976	30·027	30·231	29·685	83·1	62·9	73·0	103·0	51·5	81·6	60·5	104·3	45·8	53	6	100
	Adelaide	30·076	30·068	30·376	29·634	75·3	55·2	65·2	89·8	46·5	81·4	59·2	108·0	44·8	81	6	275
	Melbourne	30·034	29·966	30·322	29·565	71·2	52·9	62·0	88·9	43·0	74·7	54·6	105·5	37·1	168	8	344
	Sydney	30·010	30·054	30·290	29·710	74·0	61·0	67·0	90·0	51·0	75·4	63·1	102·6	48·8	842	12	1,367

The Observatory, Perth, 6th March, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for February, 1907 (completed as far as possible), and for March, 1907 (principally from Telegraphic Reports).

Stations.	February, 1907.		March, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
East Kimberley:				
Wyndham	915	14	464	7
6-Mile	1051	15	...	...
Carlton	1406	16	629	8
Ivanhoe	958	14	442	9
Argyle Downs	660	9	527	7
Rosewood Downs	623	12	...	...
Lisadell	...	...	..	...
Turkey Creek	1010	14	233	7
Ord River	...	...	...	...
Alice Downs	...	...	...	...
Flora Valley	...	...	...	...
Hall's Creek	369	9	277	5
Nicholson Plains	...	...		...
Ruby Plains	...	...	...	...
Denison Downs	...	...	...	...
West Kimberley:				
Mt. Barnett	...	...	...	...
Mt. House	...	...	...	...
Leopold Downs	...	...	...	...
Fitzroy Crossing (P.O.)	528	10	864	11
Fitzroy Station	...	...	...	...
Brooking	...	...	...	...
Cherrabun	...	..	..	..
Bohemia Downs	335	3	...	...
Quanbun	...	...	...	...
Nookanbah	561	8	...	..
Upper Liveringa	510	5	352	10
Yeeda	468	10	...	...
Derby	452	8	875	16
Pt. Torment	460	8	858	15
Obagama	633	15	924	16
Beagle Bay	515	12	...	...
Roebuck Downs	486	10	542	12
Kimberley Downs	450	8	...	...
Broome	445	8	396	9
Thangoo	...	...	...	...
La Grange Bay	485	9	791	8
N.W. Coast:				
Wallal	229	4	537	11
Pardoo	121	4	...	...
Condon	336	4	291	8
DeGrey River	275	5	434	10
Port Hedland	145	6	607	8
Boodarie	214	5	637	7
N.W. Coast—*contd.*				
Balla Balla	...	...	...	...
Whim Creek	395	8	1022	9
Mallina	486	7	..	...
Croydon	192	7	...	...
Sherlock	...	...	..	...
Woodbrooke	220	3	1134	9
Cooyapooya	367	7	1074	9
Roebourne	94	2	1019	7
Cossack	104	2	1498	8
Fortescue	69	3	1030	6
Mardie	136	5	673	7
Chinginarra	125	3	824	6
Yarraloola	352	7	340	6
Peedamullah	...	...	...	...
Onslow	46	3	504	8
Point Cloates	...	...	...	...
N.W. Inland:				
Ethel Creek	43	5	...	...
Warrawagine	229	3	...	...
Eel Creek	219	6	...	...
Muccan	...	...	...	...
Ettrick	327	7	..	...
Strelly	350	4	372	9
Mulgie	143	6	...	...
Warralong	338	5	...	..
Coongon	317	6	449	8
Talga	59	5	152	8
Bamboo Creek	203	7	520	11
Moolyella	..	...	...	...
Marble Bar	219	8	350	9
Warrawoona	141	3	595	8
Corunna Downs	331	7	298	8
Mt. Edgar	103	2	...	...
Nullagine	104	4	392	7
Middle Creek	68	6	495	8
Mosquito Creek	...	...	..	..
Roy Hill	125	5	320	8
Bamboo Springs	140	6	...	...
Kerdiadary	207	5	...	...
Woodstock	236	6	...	...
Yandyarra	223	3	...	...
Station Peak	295	7	837	8
Mulga Downs	888	6	...	...
Mt. Florence	220	5	951	7
Tambrey	444	9	671	9
Millstream	484	6	580	4

RAINFALL—*continued.*

Stations.	February, 1907.		March, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. Inland—*contd.*				
Red Hill ...	244	2	412	3
Mt. Stewart ...	...	...	...	...
Peake Station ...	89	5	...	...
Nanutarra ...	531	6	...	...
Yanrey	611	8	...	...
Wogoola ...	604	7	496	6
Towera	430	5	...	...
Gascoyne:				
Winning Pool ...	188	7	415	3
Coordalia ...	...	...	...	...
Wandagee ...	48	3	...	...
Williambury ...	82	3	...	...
Yanyeareddy ...	...	...	...	...
Maroonah ...	200	3	...	...
Ullawarra ...	152	4	...	...
Mt. Mortimer ...	...	...	...	...
Edmunds ...	246	8	...	...
Gifford Creek ...	135	4	.	...
Bangemall ...	160	1	...	...
Mt. Augustus ...	...	...	...	...
Upper Clifton Downs	170	6	293	3
Clifton Downs ...	19	2	511	5
Mearerbundie ...	64	4	...	...
Byro	110	3	238	4
Meedo	81	2	...	...
Minnie Creek ...	119	6	360	3
Bintholya ...	...	...	...	...
Lyon's River ..	67	2	691	3
Mangaroon ...	...	...	...	...
Booloogooroo ...	26	2	...	...
Doorawarrah ...	...	...	...	...
Brick House ..	Nil	...	252	4
Boolathana ...	Nil	...	351	5
Carnarvon ...	Nil	...	211	5
Point Charles ...	Nil	...	...	...
Dirk Hartog ...	Nil	...	...	...
Sharks Bay ...	Nil	...	48	1
Wooramel ...	13	1	116	3
Hamelin Pool ...	28	3	35	1
Kararang ...	Nil	...	64	1
Tamala	17	1	95	2
Yalgoo District:				
Woolgorong ...	51	4	135	3
New Forest ...	Nil	...	...	...
Yuin	...	...	...	...
Yalgoo District—*contd.*				
Pindathuna ...	...	...	...	...
Tallyrang ...	...	...	...	...
Mullewa ...	42	2	87	2
Kockatea ...	196	2	90	2
Barnong ...	19	2	238	3
Gullewa	28	1	134	3
Gullewa House ...	34	2	235	4
Gabyon	28	1	...	...
Mellenbye ...	216	4	134	7
Wearagaminda ...	138	6	192	3
Yalgoo	26	2	224	4
Wagga Wagga ...	105	5	233	5
Muralgarra ...	40	2	158	3
Burnerbinmah ...	55	4	167	3
Nalbara	32	2	...	...
Wydgee	49	5	212	5
Field's Find ...	84	3	209	5
Thundelarra ...	160	5	237	3
Rothesay ...	...	...	...	...
Ninghan ...	186	3	201	2
Condingnow ...	107	4	270	6
163-Mile ...	37	2	266	4
Palaga Rocks ...	...	...	...	...
126-Mile ...	53	3	220	3
90-Mile	6	3	318	6
Mt. Jackson ...	96	3	282	6
Murchison:				
Wale	17	1	97	2
Yallalonga ...	...	...	...	...
Billabalong ...	40	1	91	3
Twin Peaks ...	Nil	...	172	5
Murgoo	15	1	186	5
Mt. Wittenoom ..	94	2	93	3
Meka	55	2	150	4
Wooleane ...	15	1	179	5
Boolardy ...	...	...	...	...
Yederah ...	47	3	...	...
Woogorong ...	17	1	187	3
Manfred ...	56	3	361	5
Yarra Yarra ...	...	...	...	...
Milly Milly ...	72	4	237	4
Berringarra ...	11	2	379	3
Mileura	Nil	...	393	3
Mt. Gould ...	...	...	...	..
Moorarie ...	66	1	206	1
Peak Hill ...	63	7	385	7
Minderoo ...	165	2	...	...
Abbotts	125	2	327	4
Belele	26	1	402	4

RAINFALL—*continued.*

Stations.	February, 1907.		March, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Murchison—*contd.*				
Gabanintha ...	62	4	277	6
Bungalow ...	46	2	207	4
Quinn's	167	3	275	2
Nannine	167	3	318	5
Annean	36	4	448	4
Tuckanarra ...	160	4	398	4
Coodardy ...	140	4	250	2
Cue	161	4	201	3
Day Dawn ...	72	3	197	2
Lake Austin ...	136	3	297	3
Lennonville ...	96	6	428	7
Mt. Magnet ...	131	3	276	4
Youeragabbie ...	9	1	...	...
Murrum	30	2	210	3
Challa	185	4	355	4
Nunngara .	29	3	321	5
Berrigrin ...	51	2	434	7
East Murchison:				
Gum Creek ...	149	4	400	9
Dural	61	2	221	7
Wiluna	87	2	274	7
Mt. Sir Samuel ...	93	3	224	6
Leinster ...	90	3	...	...
Lawlers	80	3	252	4
Wilson's Patch ...	47	4	...	...
Lake Darlôt ...	...	...	..	...
Darda	54	5	...	...
Salt Soak ...	177	9	263	6
Duketon . .	153	8	346	7
Erlistoun ...	155	4	...	...
North Coolgardie Goldfields:				
Laverton ...	115	4	454	9
Mt. Morgans ...	87	5	441	6
Murrin Murrin ...	109	5	661	8
Mt. Malcolm ...	170	7	233	8
Mt. Leonora ...	208	4	356	5
Tampa	56	3	401	8
Kookynie ...	65	5	450	8
Niagara	86	5	386	7
Yerilla	35	1	450	7
Yundamindera ..	212	6	523	7
Mt. Celia ...	97	7	...	...
Edjudina ...	35	4	204	5
Quandinnie ...	40	1	320	5
Menzies	10	1	169	7
Mulline	104	4	432	6
Mulwarrie ...	91	2	398	7
Goongarrie ...	155	4	305	7
Coolgardie Goldfields:				
Waverley ...	111	3	240	4
Bardoc	209	4	421	5
Broad Arrow ...	87	3	227	8
Kanowna ...	67	4	393	9
Kurnalpi ...	100	4	455	7
Bulong	155	3	357	8
Kalgoorlie ...	49	4	357	8
Coolgardie ...	98	3	527	9
Burbanks ...	77	2	289	7
Bulla Bulling ...	47	2	311	6
Woolubar ...	40	1	458	6
Waterdale ...	27	5	617	8
Widgiemooltha ...	137	3	503	11
15-Mile Condenser	43	2	372	6
50-Mile	52	4	...	...
Norseman ...	116	2	319	13
Lake View ...	121	1	...	...
Frazer Range ...	41	2	...	...
Southern Hills ...	225	4	504	8
Yilgarn Goldfields:				
129-Mile	10	2	97	7
Emu Rocks ...	...	...	...	...
56-Mile	14	3	164	4
Glenelg Rocks ...	8	2	135	9
Burracoppin ...	4	1	84	2
Bodallin ...	35	1	197	3
Parker's Road ...	...	...	...	...
Southern Cross ...	12	3	199	8
Parker's Range ...	15	3	232	8
Yellowdine ...	82	1	215	3
Karalee	67	1	322	6
Koorarawalyee ..	2	2	325	8
Boorabbin ...	31	4	366	8
Boondi	126	3	335	7
South-West (Northern Division):				
Murchison House	Nil	...	100	1
Mt. View ...	Nil	...	Nil	...
Mumby	34	1	149	4
Willow Gully ...	...	...	70	2
Northampton ...	Nil	...	114	3
Chapman Experimental Farm	161	2	65	1
Narratarra ...	Nil	...	35	2

RAINFALL—*continued.*

Stations.	February, 1907.		March, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
South-West (Northern Division)—*contd.*				
Oakabella ...	...	...	...	...
White Peak ...	Nil	...	41	2
Geraldton ...	Nil	...	93	5
Hinton Farm ...	...	...	...	...
Tibradden ...	...	...	...	...
Myaree	50	1	100	4
Sand Springs ...	...	...	92	1
Nangetty ...	93	4	109	3
Greenough ...	Nil	..	42	4
Bokara	5	1	56	6
Dongara ...	Nil	...	51	6
Strawberry ...	145	3	87	4
Yaragadee ...	23	1	103	3
Urella	5	1	112	4
Opawa	31	2	59	5
Manara	58	2	66	3
Mingenew ...	16	3	85	5
Yandenooka ...	Nil	...	24	1
Arrino	450	1	93	3
Three Springs ..	51	1	108	6
Carnamah ...	28	3	89	2
Jun Jun	70	2	132	4
Watheroo ...	81	4	102	4
Nergaminon ...	88	4	127	6
Dandaragan ...	Nil	...	76	6
Yatheroo ...	Nil	...	...	...
Moora	11	2	91	4
Walebing ...	51	4	109	7
Round Hill ...	26	2	99	5
New Norcia ...	46	3	44	4
Wongon Hills ...	131	3	131	6
Wannamel ...	Nil	...	78	6
Gingin	39	2	102	5
South-West (Metropolitan):				
Wanneroo ...	4	1	60	5
Belvoir	Nil	...	70	4
Wandu	1	1	52	6
Mundaring ...	Nil	...	106	6
Canning Waterworks	Nil	...	53	7
Kalbyamba ...	2	1	..	...
Guildford ...	1	1	26	3
Perth Gardens ...	5	1	51	6
Perth Observatory	6	1	53	6
Highgate Hill ...	8	1	27	3
Subiaco	2	1	56	5
Claremont ...	...	...	...	...
South-West (Metropolitan)—*cont.*				
Fremantle ...	3	1	46	6
Rottnest	Nil	...	28	3
Rockingham ...	Nil	...	42	8
Jandakot ...	Nil	...	30	2
Armadale ...	...	...	...	...
Mundijong ...	12	1	...	...
Jarrahdale ...	Nil	...	92	5
Jarrahdale (Norie)	2	2	102	4
Serpentine ...	5	1	52	4
Extreme South-West:				
Mandurah ...	1	1	25	4
Pinjarra (Blythewood)	5	1	36	3
Pinjarra ...	4	2	45	3
Upper Murray ...	10	3	55	5
Yarloop	1	1	169	5
Harvey	Nil	...	85	5
Brunswick ...	Nil	...	101	2
Collie	4	2	114	3
Glen Mervyn ...	65	2	201	2
Donnybrook ...	55	3	160	5
Boyanup ...	59	2	178	3
Bunbury ...	2	1	122	4
Elgin	50	4	110	4
Busselton ...	39	3	85	5
Quindalup ...	41	3	159	5
Cape Naturaliste	60	4	121	4
Glen Lossie ...	...	...	163	...
Karridale ...	21	3	237	7
Cape Leeuwin ...	86	7	224	11
Lower Blackwood	...	...	96	3
Ferndale ...	63	1	94	4
Greenbushes ...	80	1	96	3
Cooeearup ...	79	1	91	4
Bridgetown ...	73	1	135	5
Hilton	69	1	99	4
Greenfields ...	49	2	186	5
Dunninup ...	60	1	...	...
Cundinup ...	172	1	150	3
Wilgarrup ...	39	2	119	7
Balbarrup ...	93	2	109	2
Bidellia ...	...	...	...	...
Westbourne ...	34	2	200	8
Deeside	34	2	107	4
Riverside ...	29	3	123	5
Mordalup ...	9	3	167	4
Lake Muir ...	43	2	153	6

RAINFALL—*continued.*

Stations.	February, 1907.		March, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Eastern Agricultural Districts:				
Walgo	23	2	235	6
Emungin ...	...	...	...	...
Dowerin ...	109	2	108	5
Warramuggin ...	...	...	..	...
Oak Hill ...	...	...	...	...
Baker's Hill ...	Nil	...	127	3
Monglin	...	...	...	...
Hatherley ...	60	3	...	..
Momberkine ...	Nil	...	..	...
Bolgart	..	...	...	..
Eumalga ...	26	1	68	5
Newcastle ...	Nil	...	40	2
Craiglands ...	Nil	...	68	4
Eadine	Nil	..	37	3
Northam ...	2	1	161	6
Grass Valley ...	10	1	128	5
Cobham	4	1	69	6
York	2	1	76	6
Burrayocking .	39	2	88	7
Meckering ..	13	1	138	4
Cunderdin ..	81	1	109	5
Doongin	53	3	74	3
Whitehaven ..	72	2	110	5
Mt. Caroline ...	17	1	176	6
Cutenning ...	Nil	...	211	7
Kellerberrin ...	5	1	130	6
Cardonia ..	10	1	165	8
Baandee ...	20	2	174	4
Nangeenan ...	4	1	152	5
Merredin ...	10	1	120	4
Codg-Codgen ...	18	2	128	5
Noongarin ...	..	..	...	.
Mangowine ..	8	1	127	6
Yarragin ...	15	1	122	4
Wattoning ...	Nil	...	102	3
Koomberkyne ...	118	5	89	9
Great Southern Railway Line:				
Dalebridge ...	7	1	30	4
Beverley ...	Nil	...	73	4
Brookton ...	19	2	48	5
Sunning Hill ...	37	2	52	5
Pingelly ...	30	3	79	7
Yornaning ...	72	3	47	4
Narrogin ...	65	2	82	5
Narrogin State Farm	44	1	...	...
Rose Hill ...	53	2	40	4
Wagin	80	2	37	3

Stations.	February, 1907.		March, 1907.	
	No. of points 100 = 1in.	No of wet days.	No. of points 100 = 1in.	No. of wet days.
Great Southern Railway Line—*contd.*				
Katanning ...	32	2	137	5
Sunnyside ...	64	2	47	3
Broomehill ...	47	1	62	3
Woodyarrup ...	97	2	206	6
Pallinup ...	99	2	207	2
Tambellup ...	1	1	178	4
Toolbrunup ...	41	2	104	1
Cranbrook ...	36	2	123	7
Stirling View .	72	5	231	10
Kendenup ..	54	3	151	7
Woogenellup ...	46	4	206	9
Woodburn ...	28	2	241	6
Wattle Hill ...	...	.		...
St. Werburgh's..	34	5	240	12
Mt. Barker ...	39	4	254	9
West of Great Southern Railway Line:				
Talbot House .	Nil		44	4
Jelcobine ...	18	2	21	1
Bannister ...	Nil		134	3
Wandering ...	14	3	156	4
Glen Ern ...	17	3	.	...
Marradong ...	8	1	92	3
Wonnaminta ...	51	2	78	6
Williams ...	24	1	81	4
Rifle Downs ...	12	1	...	...
Darkan		...	...	...
Arthur River ...	19	1	57	4
Gainsborough ...	17	1	31	2
Glenorchy ...	90	1	90	5
Kojonup ...	45	1	113	5
Blackwattle ...	...	...		...
Warriup ...	52	4	147	9
Forest Hill ...	60	6	235	9
East of Great Southern Railway Line:				
Sunset Hills ...	...	.	...	...
Oakdale	10	1	51	3
Barrington ...	. .	...	...	...
Bally Bally ...	53	1	...	...
Stock Hill ...	61	1	4	1
Qualin	16	2	64	5
Woodgreen ...	18	3	52	7
Glenallan ...	25	1	81	5
Gillimanning ...	39	2	...	...

RAINFALL—*continued.*

Stations.	February, 1907.		March, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of Points. 100 = 1in.	No. of wet days.
East of Great Southern Railway Line—*contd.*				
Wickepin ...	85	2	44	4
Crooked Pool ...	65	2	65	2
Nallyring ...	43	2	95	6
Yardup ...	101	5	125	10
Bunking ...	21	1	49	4
Bullock Hills ...	32	1	78	2
Dyliabing ...	126	2	95	10
Glencove ...	111	2	...	...
Cherillalup ...	57	3	...	...
Mianelup ...	140	3	112	4
Woolganup ...	82	3	101	4
Chillinup ...	90	2	...	...
Jarramongup ...	...	...	...	...
Uberin	104	3	103	5
South Coast:				
Wilson's Inlet ...	29	6	174	10
Grasmere ...	26	3	145	12
King River ...	24	2	420	9
Albany	29	4	187	11
Point King ...	20	1	190	5
Breaksea ...	23	7	253	15
Cape Riche ...	32	1	201	5
South Coast—*contd.*				
Peppermint Grove	29	4	173	9
Bremer Bay ...	30	4	173	9
Coconarup ...	33	3	210	11
Ravensthorpe ...	40	5	253	11
Cowjanup ...	...	...	...	...
Hopetoun ...	37	5	140	10
Fanny's Cove ...	Nil	...	...	...
Park Farm ...	7	2	184	8
Grass Patch ...	...	...	202	8
Swan Lagoon ...	16	1	176	7
30-Mile	25	1	188	8
Gibson's Soak ...	3	1	159	9
Myrup	15	1	147	10
Esperance ...	14	2	178	11
Boyatup... ...	20	2	...	...
Lynburn ...	3	1	177	8
Cape Arid ...	...	..	...	...
Point Malcolm ...	18	2	218	9
Israelite Bay ...	21	4	295	11
Nannambinia ...	11	1	...	...
Balbinia... ...	226	4	...	...
Balladonia ...	73	4	310	10
Eyre	22	1	365	6
Mundrabella ...	...	...	...	...
Eucla	1	1	119	5

The Observatory, Perth,
9th April, 1907.

W. E. COOKE,
Government Astronomer.

By Authority: Fred. Wm. Simpson, Government Printer, Perth.

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NOTES.

Agricultural Lecture.—On Wednesday, 9th May, Mr. P. Wicken, the Field Officer of the Department, paid a visit to Bullsbrook and in the evening delivered a lecture on grasses and fodder plants, at the Agricultural Hall. The lecture was illustrated by lantern slides, and was well attended by local settlers.

Exporting Trees and Plants to South Africa.—A copy of regulations dealing with the importation of trees and plants into South Africa has just been received by the Under Secretary of Agriculture, who desires to notify all nurserymen and others that it would be to their interests before sending any goods to South Africa to first apply to the Department for particulars of the regulations governing such shipments.

Sprouting Seed Potatoes.—A correspondent writes asking what material to use with tubers when placing them in a box to sprout. From a number of experiments tried from time to time with sand, charcoal ashes, etc., it has been found best not to use anything at all. Just stand the tubers in the box on their stalk ends and occasionally spray with a weak solution of Burgundy or Bordeaux mixture, just damping the skins without making them wet.

A Wonderful Cow.—The following is the record of a Guernsey cow, bred in England, and sent to America. As a two-year-old she gave a yield of 9,958.7lb. milk and 533.83lb. fat for the year. At 4½ years old she gave 13,636.80lb. milk and 714.10lb. fat, the average being 5.24lb. She stands at the head of the two classes in which she was tested. She was lately sold for £800, the highest price ever paid for an animal of this breed.

* * *

Mount Barker.—Now this State is taking her place in the world's fruit markets considerable interest is being exhibited as to where the best kind of land for apple culture can be found. Apples will, there is no doubt, form the principal fruit for export, and nowhere do they grow better than in and around Mt. Barker. The orchards there are rapidly becoming famous for the productions of high-class fruit. In this issue will be found two illustrations of Mr. H. Robinson's "Omrah" orchard, which speak for themselves.

* * *

Coast Cattle.—For some time it has been admitted that cattle kept in close proximity to the coast develop larger frames and are more reliable than those depastured on bush country further inland. A sample of the water taken from a spot near the lime deposits on the coast was forwarded to Mr. Mann, the Government Analyst, for the purpose of testing it for phosphates and alkalins. Mr. Mann, after examination, reports that the water contained no phosphate, and only 10.5 grains per gallon of lime. So that it is far more likely that it is the herbage, affected by the country, that is accountable for the enlarged bone formation in the cattle.

* * *

Fruit Fly.—Mr. Bailey, one of the Inspectors under the Insect Pests Act, while carrying out his duties at Claremont, made the startling discovery that the fruit of the African box thorn was thickly infested with the fruit fly. Mr. Bailey brought some of the berries into Mr. T. Hooper, the Chief Inspector, who placed them under observation, and ten days afterwards reported that he had bred out 130 fruit flies and 240 blue tomato flies from the berries received. This discovery is a very important one as it shows that the fruit fly can adapt itself to a variety of fruits and berries. It should also act as a warning to fruitgrowers and vegetable gardeners of the great danger that exists where this plant is used as hedging, providing, as it does, such a harbour for the fly.

* * *

Fine Crops.—A case containing samples of rape, lucerne, and paspalum has been received by Mr. W. Paterson from Mr. F. Piesse of Katanning. The rape was from a hundred-acre paddock which was sown in the middle of January last; it was a splendid size and equal to a three-months' winter growth in the more northern districts. The lucerne was from two different paddocks, one lot being five weeks' growth on three-year old plants, the other from seed sown last September. The paspalum was from a forty-acre paddock sown in September last. Judging from the splendid appearance of the plants and the time of the year, the end of a long, dry summer, the problem of summer feed for sheep, stock, or dairy purposes may be considered to have been solved so far as that particular district is concerned, and what is still more encouraging is the statement made by Mr. Piesse that there are thousands of acres more of the same kind of ground waiting to be utilised. The plants forwarded were grown on fallow, sandy loam without manure.

Shipment of Stock.—One of the largest and most valuable shipments of stock that has ever been imported into Western Australia arrived by the s.s. Junee from the Eastern States on the 8th inst. Included in the shipment there were 4,421 sheep, of which 2,000 were consigned to Messrs. Forrest, Emanuel and Co., 1,500 to Messrs. Copley and Co., 500 to Messrs. Elder, Shenton and Co., and 200 to Messrs. J. and L. Baker. The balance of the shipment, consisting of 751 rams and 58 donkeys, were consigned through to Nor'-West ports. The donkeys will be landed at Geraldton, and the rams at various ports in the Nor'-West. Two of the rams in Messrs. Dalgety and Co's. consignment are valued at 100 guineas each, while the balance of the shipment are roughly valued at three guineas each.

Strawberry Culture.—At one time it was considered that Kalamunda was going to be the strawberry-growing district of this State, but owing to the partial failure of the crops the last two seasons, fear has been generated that the advantages of this district for berry cultivation had been over-estimated. Elsewhere in this issue a most valuable article on this subject is published, containing reports by Mr. Inspector Whittington and Mr. Mann, the Government Agricultural Chemist. Mr. Whittington's opinion on this matter is of value, being as it is the outcome of years of practical experience, when he used to send in tons of berries at a time to the principal markets of England, competing successfully against all other growers. Mr. Mann's report deals with the scientific side of the matter, and the advice given to would-be berry growers should be carefully followed.

West Australian Apples and Pears.—By the last English mail Messrs. G. S. Yuill and Co., Ltd., of Perth, received a report from their London house concerning the 247 cases of fruit shipped to London from this State by the R.M.S. Orontes. The report states:—"Orontes shipment of fruit.—We have to report that this vessel turned out her fruit in very good condition. Your shipment of fruit was sold in competition with Victorian, Tasmanian, and South Australian, and realised, viz.:—Cleopatra, 13s. to 15s. 6d.; Dunn's Seedling, 11s. 6d. to 15s; Ribston, 11s. 6d. to 15s.; Jonathan, 11s. 6d. to 18s.; rather better average prices than for similar varieties from other States, particularly the Jonathans. We have to report that six cases of pears came to hand in a practically useless condition, the bulk of them being rotten or 'dead.' It is unfortunate, as had the pears arrived in sound condition, we should have made fancy prices for such handsome fruit. We would suggest that you advise your friends that in making future shipments they pack the pears in trays—three trays to the bundle or case—wrap them (the pears) in double paper, and put just a sprinkling of wood wool between the wood and the fruit."

The Angora Goat.—That the Angora goat is something more than a fad (says the Sydney *Daily Telegraph*) is shown by the sensational price obtained by Messrs. Blaxland and Knox, of Wyalong No. 2 station, for the fleece of the stud buck Perfection, namely, 4s. 2d. per lb. Perfection was bred by Messrs. Kidman and Kempe, at the Peake station, Central Australia, and was bought privately by Mr. Blaxland for 75 guineas after the dispersal sale of the Peake flock, which took place in Adelaide in May 1906. Perfection was shorn at Wyalong No. 2, Wyalong, N.S.W., in September last, cutting a fleece weighing 9lb. 8oz., the staple measuring 14in. to 15in. The skirted portion of the fleece, namely, 6lb., was forwarded to a New York merchant, who paid for it at the rate of one dollar (4s. 2d.) per lb., leaving a net return, after deducting cost of transmission, of £1 2s. It may be of interest to those who are watching the growth of the Angora goat industry in these States to know that at the end of last month a shipment of eight bales of greasy mohair (weighing 23cwt. 3qr. 9lb.) was made in the steamer Afric for sale in London, on behalf of the 17 constituents, by Messrs. Dalgety and Co., and they expect to ship another six bales at the end of this month.

Cold Storage.—It is strange that not one of the advocates of the establishment of cold storage works in this State has urged the introduction of sterilising in connection with this matter. While all must admit of the great value that will accrue by storing fruit and meat in places where a temperature can be maintained that will arrest all decay, yet how much more advantageous it must be to not only arrest, but destroy, all germs of decomposition. In cold storage simple, so soon as the article is taken out of the chamber and brought into a warmer atmosphere then the dormant germs of decomposition are at once brought into a state of greater activity than existed before storing. Were these germs, however, completely destroyed by sterilisation of the atmosphere in which the goods are placed, then not only would the articles present a better appearance when offered for use, but be more wholesome and not so readily spoilt. A short article on the subject appears in this issue which is recommended to all interested in this vital question.

Aphistine for Spraying.—The advantage of spraying for the subjection of insect and fungoid pests in the garden and orchard is an important operation that requires to be thoroughly understood; none the less important is the nature of the spray used. Amongst the more recently introduced mixture is that called "Aphistine," introduced into this State by the Vacuum Oil Co. of Fremantle. Mr. Breen, one of the Inspectors under the Insect Pests Act, on the Great Southern Railway line, in a recent report stated:—"I visited Mr. Strick's orchard in order to see if the instructions to spray had been carried out. I found that every tree had been treated and it was impossible to find any trace of infestation of woolly aphis or mussel scale, the work had been done so thoroughly. The mixture used was Aphistine, and had been prepared as follows:—2 gallons of aphistine and one gallon water boiled together to form the stock, one part to thirty parts of water being used to spray with. Although this was used early in March, when the foliage was still on the trees, no damage was done. The total cost of the mixture used on thirteen acres was 13s.

Cats Killing Rabbits.—It will be remembered that some time ago a number of cats were procured and liberated in the Eucla district in order to wage war with the threatened rabbit invasion. The matter has been recalled by a letter received by the Department of Agriculture from Mr. H. A. John, a member of the telegraph construction party working near Eucla. In his letter Mr. John states:—"As I have not seen any reports published as to the fate of some 200 tabby cats which were purchased by the Government in Perth about six years ago and liberated at Eyre's Sand Patch and Eucla, I thought I would report to you my observations while on the construction of the telegraph line from Eucla to Norseman in 1905. On one occasion my mate and I went out rabbit-shooting in the vicinity of the Cocklebiddy rock-hole,. and, to our surprise, we came across a tabby kitten, and, on going further with our search, we found four more kittens about five or six weeks old. My mate caught one, but he soon had to let it go, as the old cat came on the scene. Then they all retreated to a rabbit burrow. The most interesting part of this experience was that in my search for the remainder of the kittens I found under a bush no fewer than 14 dead rabbits, whose blood had been sucked from them. I am sure none of the rabbits had been dead for more than two days. It seems therefore that the cats are doing valuable work. The rabbits around Eyre's Patch were very weak; they appeared to have been starving owing to the scarcity of food. The rabbits between Balladonia and Norseman were in splendid condition."

Hand v. Machine Shearing.—The advent of the shearing machine was hailed by most pastoralists as a great advantage over the old way of removing the fleece with the shears. It cut closer, and was much quicker in its operation than the old-fashioned way with the shears, and it was believed that the sheepowner who used the machines got more wool than he who shore by hand. Many experiments have shown that a sheep shorn by shears, and then gone over with the machine, will yield from 7 oz. to 10 oz. of wool, and sometimes a good deal more. The appearance of the machine-shorn sheep about four months after shearing is much in its favour. But all pastoralists, however, were not in favour of the machine. It was said that the machine-shorn sheep suffered more than the hand-shorn if a cold snap set in immediately after shearing, and that they were apt to scald if the weather became suddenly hot. It was noticed, also, that the wool was slow in starting to grow after being shorn by the machines. This is believed to be owing to the method of cutting, causing a drag on the wool fibres. We have heard of several tests being made as to the advantage of the machines over the shears, but until lately never could obtain any definite results. While on the Canowie estate lately, we learned that this matter had been tested for three seasons. A number of sheep of the same age and sex were equally divided, one-half of which were shorn with the machine and the other with the shears. Each lot was branded, and the whole were run in the same paddock till next shearing, when they were drafted and shorn as before. This operation was repeated for three years, and it was found that the hand-shorn sheep gave a return of 7 oz. per head over the machine-shorn sheep.

Steam Ploughing.—It is reported that the recent trial of steam ploughing by tractor, given by the agents, Messrs. George Willis and Co., with a couple of their recently-sold Buffalo Pitts steam ploughing engines on Mr. C. Armstrong's farm adjacent to Katanning township, was attended with great success. There were a large number of farmers present, who were greatly impressed not only with the actual ploughing itself, but with the easy manner in which the engines were handled in such small confinement, clearly demonstrating that, apart from their great saving in labour in reducing the cost of ploughing to a minimum, they are equally practicable for the small holder as for the settler on a larger scale. The ground ploughed was a very fair average of the general run of country to be found in this State, the ploughs used being both disc and mould-board. The celebrated Deering stump-jump mould-board plough did excellent work, and took the hard ground in a surprising manner. The agents inform us that they have recently made several sales in the line, and that those clients who have already purchased have, without exception, expressed themselves as very highly satisfied with their purchase. It is claimed that up to the present time the "Buffalo" is the only engine made which has proved itself practicable for ploughing purposes, and in the Eastern States they are said to be coming into universal use for all kinds of farm usage. In Western Australia this is quite an innovation, Mr. E. L. Holly, of Katanning, being the pioneer in this direction. A special feature attached to ploughing by steam, and one which applies more to Western Australia than other countries on account of its well-defined seasons, is that with the disc ploughs so much hard ground ploughing can be done before the rains set in. As it is, these ploughs require so much horseflesh that in the majority of cases the farmer has to wait until the rains come along before he can commence ploughing operations. This in itself is a disadvantage, as past experience has gone to demonstrate that the early crops come on the best. As instanced during the past two or three seasons, the rains have been exceptionally late in setting in, consequently by the time the farmer has his ploughing done, he has very little time to get his seed in. Experience has taught us that fallowing is absolutely necessary. The enterprising farmer who indulges in up-to-date methods must surely come out on top, and the foregoing should, therefore, be of general interest. The firm of George Willis and Co., and all who assisted, deserve the thanks of the farming community for the object-lesson afforded.

Destruction of Rabbits.—A further report by Dr. Danysz gives the results of the experiments in rabbit destruction carried out since October 20 last. Referring to the experiments of contagion, he states that the total result of four experiments was that 72 rabbits were infected with virus, and all died themselves and gave the disease to 193 others out of 307 healthy rabbits with which they were put. In other words, one rabbit infected directly by virus had given a mortal disease to about three others (2.68 to be exact). These experiments allowed him to affirm with certainty two very important points:—(1) The pasteurellosis of the rabbit is a disease which can transmit itself from the diseased to the healthy during the life of the diseased. (2) Spots where infected rabbits have lived and died remain infectious for a certain time. It had hardly been possible to carry on any precise experiments with rabbits living in liberty. On the island the 600 rabbits introduced had not multiplied, and actually there were not more than three or four to the acre. Dealing with experiments of rabbits directly infected with the virus, Dr. Danysz states that out of 47 rabbits which had received the virus directly in the mouth, 46 died. Out of 50 fed on lucerne, sprinkled with the virus, 48 died. Out of 45 fed with pollard 25 died. In its present condition of virulence it was necessary to introduce at least one drop of the culture of virus in the mouth of a rabbit to infect and kill him with certainty. With one pint of the virus it was possible to infect 10,000 rabbits in this way, and it might be possible to reduce the dose to one-tenth of a drop. Dr. Danysz states that on December 25 320 healthy rabbits were put into a paddock of three acres with a few sheep, cows, horses, pigs, goats, fowls, and three kangaroos. They were fed on lucerne contaminated with the minced flesh, mixed in water, of two rabbits dead of infection. On January 4, 20 infected rabbits were put in the paddock, and on January 25 more infected lucerne was spread about. By the end of that month only 32 live rabbits could be accounted for. "From what has been seen, we can conclude," says Dr. Danysz, "that in order to have good results, we must have some virus sufficiently virulent so that a very small quantity of culture, say one drop, absorbed by rabbits in some way or other kills them with certainty in a proportion of 95 per cent. at least. The preparation of the rabbit virus in pure cultures, and the growing of cultures for use on a large scale, will require a special laboratory and can only be conducted by a bacteriologist, expert in this kind of work. This laboratory will manufacture very active virus, which, sealed in small glass tubes, will preserve all its activity for at least three months. In order to spread the virus during say, four or five months of the year and propagate the epidemic, so as to get good results, we would have to use, I believe, about five litres (ten pints) of virus for each 1,000 acres per week, which would amount to large quantities for the treating of the rabbit-infected parts of Australia. There would be no difficulty in preparing several tons of the virus per week, or even per day, in a properly-appointed special laboratory. The virus, prepared in the central laboratory and enclosed in bottles or in tins, would have to be used at least 15 days after its preparation. Its price would be fairly high. With packing and sending, it would cost at least 6d. per pint"

HORSE-BREEDING.

SOME USEFUL POINTS.

By R. E. WEIR, M.R.C.V.S.

Following is the text of a paper on horse-breeding, read by Mr. R. E. Weir, Chief Inspector of Stock, before the second annual conference of the Sussex District Association, held at Busselton recently:—

"No other branch of the stock-raising industry offers such attractions to the average husbandman as horse-breeding, and most certainly no other requires such care and aptitude to make it a success as is necessary with the breeding of this class of animal. Some, from a natural love of the horse, though without previous experience, have been tempted, when good prices have been ruling, to embark in horse-breeding, with the consequence that, after expending all their available capital, they have arrived at the conclusion that the industry did not pay. This may be the case when the work has been undertaken by inexperienced persons and practised solely on its own, but when carried out by persons capable of good judgment and economy, and more particularly if associated with other pursuits of a rural character, the results are usually of a very profitable nature. The chief factor to be considered by the breeder is the production of an animal most suited to the conditions prevailing in the particular locality in which he may be situated. He must also bear in mind the class which would prove most marketable. The principal breeds to be considered are draughts, thoroughbreds, and light-harness horses.

Draughts.

"The class of draught which most meets the requirements of the farming community of this State may be represented by the Clydesdale. Chiefly for the reason that this particular breed combines strength with activity, and invariably possesses what breeders most desire, namely, 'flat bone,' a structural formation which provides the greatest amount of resistance against concussion, and consequent freedom from lameness, more especially when they have to labour on macadamised roads or streets. Oblique shoulders and sloping pasterns are also special features of Clydesdales, providing that graceful, free action which gives them such an advantage over their great rival, the Shire. When heavier weight and strength are desired, however, crossing the two breeds gives good results, which should not be lost sight of by breeders.

Thoroughbreds.

"Built on lines directly opposite to the Clydesdale, this animal is bred chiefly for the turf, and with the object of securing the greatest amount of speed. For a young country, Australia has done more to advance the interests of this breed than any other part of the world. The rich prizes which are annually distributed at the principal race meetings have caused keen competition in attainment, and many have embarked in breeding this model galloping machine, with various results. Some have not been successful; others have done well, whilst a few have become notable in the production of most superior animals. Some decry the thoroughbred of the present day as being inferior to those of past ages, but when analysing their weight-carrying capabilities and performances, we find the opposite is the truth, and the facts are in favour of the more recent production. On the other hand, it is a recognised fact that the stamina of many animals is frequently impaired by preparing them for the turf when too young; though when breeding is being carried out in the country parts where they are allowed to run until greater maturity is attained, the best possible results are usually secured by the production of a good, sound-constitutioned animal. For remount breeding, no better sire can possibly be crossed with half-bred mares, and as a never-failing demand for this marketable commodity exists within the State, the trade should be encouraged as much as possible by breeders.

Hackneys.

"In ancient times, long before good roads or railways were in existence, this class of animal served the purpose, as the most perfect riding horse, possessing good galloping, trotting, and staying capabilities. It was then a frequent custom to arrange trotting matches between two specially noted horses of this class, and the records established were usually of a remarkable character. Two distinct breeds were then recognised, but these have since merged into one, and the physical conformation has considerably altered the present-day hackney being bred solely for harness work to the detriment of his usefulness as a riding horse. Nothing however can be more graceful than the action of the present-day well-trained hackney, and no better type can possibly be bred as a marketable product for the demand which exists for light-harness horses.

Mares.

"To attain success in the art of horse-breeding, the old physiological truth must be bornè in mind, namely, that the animals should be bred true to type. It is both waste of time and money to mate weedy mares with pure-bred and well-developed sires as the results are frequently of a disappointing character. No matter what the breed may be, both dam and sire should be as near as possible alike, as only by this means can any degree of security be obtained with regard to the progeny. In the selection of mares, age requires special consideration, as the younger the animal the greater the certainty of her producing. The custom not infrequently followed in this State of buying aged mares at about a third of their original value is usually unsatisfactory, as only a small percentage of the mares will be found to breed, and even these do not give profitable returns. In considering formation, the mare requires to be deep and stout, with well-sprung ribs, compact in build, but with the necessary width in hindquarters.

Sires.

"In choosing the sire special attention requires to be paid to the manner in which he is furnished below the body. Good bone is a most essential factor in a sire. The hocks and knees must be broad and free from blemishes the feet well developed and uniform. These points must not be lost sight of for a good-topped horse, lightly timbered. Usually, the compact and well-furnished horse proves the best sire, but the best positive safeguard is the transmitted qualities of the progeny, which should always be a guide to selection. Unsoundness, particularly of hereditary character, is to be avoided in both sexes, but especially in the sire, as much pecuniary loss occurs from the sale of young stock showing even the smallest blemish.

"Seeing that the various agricultural societies throughout the State are affiliating, the time now appears opportune for a stimulus to be given to horse-breeding by the initiation of the premium system. At the same time, some guarantee to breeders of the soundness of sires travelling in their district ought to be given in the form of free veterinary certificates to those competing at the various shows, no prizes to be submitted to other than sound horses."

STRAWBERRY CULTIVATION.

Destruction of Crops.

At the instance of Mr. A. C. Gull, M.L.A., an investigation has been made by the Department of Agriculture into the causes leading to the falling away in the strawberry crops at Kalamunda. Mr. Whittington, one of the orchard inspectors, was instructed to visit the locality, obtain samples of soil for analysing, and report on the matter.

Mr. Whittington's Report.

"It was two years ago last December since I first made an inspection of these strawberry gardens; my second visit was about a month later, when an application was made then, as now, by the growers for an investigation to ascertain the cause of the crops failing. That inspection disclosed the cause of the failure to be five distinct causes, viz., frost, leaf blight, and three kinds of beetles or bugs.

On November 21st of this year, as desired, I proceeded to Mr. Brooks' stores, and found that gentleman engaged for the day with the Roads Board committee, and he was therefore unable to give me very much time or information, but he suggested the names of a number of growers to whose places I proceeded, nearly all of which I had inspected in 1904.

Now from the first garden to the last, with but two exceptions, I was confronted with almost desolation as regards strawberry plants, and the growers themselves, disconsolate and dejected, spoke of strawberry growing as something beyond the capabilities of soil or gardener which would have damped the ardour of any but those who have had to grow the fruit under many difficulties with determination to succeed.

In the *Journal of Agriculture,* February 20th, 1905, in the latter part of my report I gave some advice *re* spraying for leaf blight and beetles, also my expectation of many plants dying out and the advisability and method of re-planting.

My prognostications have become a fact, but my advice neglected, and to-day there is a dearth of plants and loss of capital where there might have been new and flourishing young beds with prospects of remunerative returns. I might mention one small bed, which has been recently planted by young Mr. Bird. They were planted on new ground with plenty of horse manure, and the plants look like paying for all the trouble and manure bestowed upon them, providing they are kept clean and the soil kept stirred. There is also another new plot, about an acre, planted on fresh broken land, and although no manure has been dug in with them, the plants look in every way very promising, not a weed on the ground, not a miss in the rows, each row as straight as a line, and each plant growing healthy and strong. This patch was cleared and planted by Mr. Littely, and I shall anxiously watch the result of this bed as Mr. Littely has promised to keep the hoe going all the summer, and to dig in a dressing of farmyard manure between the rows during the winter. I should have preferred the new land having a dressing of farm manure and a crop of potatoes taken off first if it had been possible, but as Mr. Littely did not know anything of strawberry growing before coming to this neighbourhood, he naturally followed the methods of his neighbours. Anyhow, what he has done he has done well.

I do not think there has been such a general failure as some of the growers would persuade themselves. There has been a partial failure in some cases I am convinced, but this can be accounted for if each grower will remember the worn-out stock, the age of the plants, and the neglect to spray for leaf blight or bait for the depredations of the beetle, etc.

In one or two cases there has been a dead failure and considerable loss I acknowledge, but even in those cases I feel convinced, had the draining been thoroughly accomplished, fresh laid down plants used, the land sweetened and manured, the plants sprayed and bait put down, there would have been a crop sufficient to pay all expenses and give the grower a handsome profit.

I have not yet found a grower, who has followed out the right way of growing strawberries, make a dead failure. Of course, seasons have a lot to do with the crop, but the man who means to grow them will never have a complete failure if he follows out the following method:—

Get new stock of laid down runners.
Get the land dug at least 12in. deep.
Get it well pulverised, sweetened, and manured with farmyard manure.
Plant on a moist, well-drained, north-east aspect.
Put the plants in firm.
Keep them hoed and clean and do not dig between the rows after the early part of spring.
Spray them early in spring with a mild Bordeaux and Paris green mixture.

On first appearance of beetles and cut worms place Paris green bait about.

By constantly moving the soil around the plants it will disturb the beetles and cut worms, and the poisonous bait will account for a lot of their deaths, and the spraying of the leaf will kill the leaf-eating beetles.

Taking the district through, I find the growing of strawberries has been, in some cases, given up, whilst in others the plants have been dug out to be replanted next year.

I will deal first with those who have lost heart and think it impossible to continue growing profitably.

In most cases the plants were planted some five or six years ago, and for a few seasons they flourished, the prices kept high, then the plants gradually grew weak and fruit small and less abundant. In the case of these beds it is only fair to state that they had lived their natural length of life and bore their proper amount of fruit according to the nature of the land and climatic conditions. This is proved in the following manner:—

The natural life of a strawberry plant in colder climates is from five to seven years, and the duration of paying crops is from the second to the fifth year, after which they deteriorate and begin to die out. The fruiting season lasts from seven to ten weeks in each year, but very seldom does it reach the ten weeks, and the crop will average from one and a half to two tons per acre. Now with these figures W.A. growers compare very favourably in crop, but the plants cannot be expected to live and flourish so long. For this reason: The plants cannot live and thrive more than three to four years, for in that time they yield as much or more fruit than the plants in Europe in seven years. Good one-year plants will continue fruiting for three or four months the first year and in each of the following years will fruit from five to seven months. (I know of one instance where two acres and a few rods yielded in one year the enormous crop of seven tons one cwt. and sixty pounds—7tns. 1cwt. 60lbs.) So that by the time the plants have been in the ground four years they have worn themselves out and their life has been equal to the life of a plant in England. But the growers of this district have not taken that into consideration, and instead of having another young bed in an equally favourable position, to come into bearing every two years, so continuing their fruiting season, they have been spending their time in trying to compel the old bed to do what nature cannot as a rule allow. Also the spraying, sweetening, manuring, and bait-laying has been neglected and the insect life has had a fine opportunity to accumulate. Whereas, by the three-year system they would be disturbed and naturally unable to do so much damage. Thus the worn-out plants and the accumulation of bugs, beetles, and grubs, with leaf blight which follows excessive moisture, are the reasons of partial failure of strawberry growing; whilst in the cases of complete failure the land, in addition, has been too wet and sour. The absence of farmyard manure has been felt in almost every garden.

I have brought back samples of soil from different gardens in the district which the Analyst will analyse.

No. 1 is a sample of soil taken from Mr. Stirk's plot where the berries had been grown with success up till last winter; then the plants were dug out and this season a crop of potatoes are growing, after which strawberries will be again planted.

No. 2 sample of soil taken from Mr. Owen's garden in which strawberries have done well, but this grower has always dug in plenty of farmyard manure and in addition lightly dressed the plants with bonedust and potash.

No. 3, a sample of soil taken from a two-year old bed where the plants are already showing signs of distress. Bonedust has been used here.

No. 1b., No. 2b., No. 3b., are samples of soil taken from different parts of a large plot of Mr. Brooks's farm in which the plants did well the first year, but gradually went off the second, yielding but a very small quantity of fruit, and dying out completely the third year.

No. 4b. is a sample of virgin soil from the same farm.

No. 5 is a sample of soil taken from Mr. Mason's garden from a plot where strawberries had done remarkably well for five or six years. They were then dug out and the next season planted with young plants which did no good and died out completely within 18 months.

No. 6 is a sample of virgin soil from the same garden.

I was unable to find a garden, planted the same season, which showed the plants flourishing in one part and failing in another. Some of the growers would like the Department to get some fresh stock from Europe, plant and get them acclimatised, and they would purchase the runners."

The soils obtained were forwarded to Mr. Mann, the Government Analyst, who reported on them as follows:—

MR. MANN'S REPORT.

"I beg to furnish the following report on the above subject, after the analysis of samples of soil submitted by you. Unfortunately, only four samples were received of sufficient size for complete examination, and these cannot furnish the data which might be considered desirable for a full study of the nature of the soil under cultivation.

The examination, however, of these samples is interesting, and the results are attached.

The following samples have been analysed:—

No. 1.—From Mr. Stirk's garden. Cultivated ground on which strawberries have failed after growing for six years.

No. 2.—From the same garden. Virgin soil.

No. 3.—From Mr. Schmidt's garden. Cultivated ground where strawberries have failed after growing six years.

No. 4.—From the same garden as No. 3. Virgin soil.

They are sandy loams, the physical characteristics of which appear to be good, and suitable for the cultivation of strawberries. Experiments have shown that while clay loams are probably better for large yields, quick sandy loams are better for early crops.

Chemically, the soils are of good quality for all ordinary purposes, but as will be seen below there are special circumstances to be taken into consideration in strawberry culture which must somewhat modify this judgment.

One or two points brought out by the analyses are of interest.

(*a.*) While the total amount of nitrogen in the soil is fair and in some cases very good, the amount of this "available" for plant life as shown by the amount of "nitrates" is, with one exception, relatively small, only 4½ lbs. per acre being present in one case. This is very important.

(*b.*) The "total" potash is small, but the proportion "available" reaches the amount considered necessary for a fertile soil. It is noteworthy, however, that the "available" potash is greater in each case in the virgin soil than in the cultivated land. This also is suggestive.

While the strawberry is not at all an exhausting crop on the land, it nevertheless has to be remembered that in practice it requires much heavier manuring than most fruit crops. The reason for this is the short growing period of the crop. With favourable conditions the plants grow fast, soon blossom, and rapidly develop their fruit. The consequence is that they require in a short time relatively large amounts of immediately available nitrogen, phosphoric acid and potash, and these foods must be in the soil in abundance to meet this demand if the best results are to be obtained.

This primary fact must be borne in mind continually, and will explain some of the opinions expressed below. A soil which might be considered good, and even rich, for ordinary agricultural purposes when used for crops occupying the ground for relatively long periods and with different habits of growth, might give very disappointing results with this particular fruit.

Bearing these facts in mind and in view of the results of analysis, I would advance the following opinions which may be of some assistance in dealing with the case:—

1. That one cause of the failure of crops is probably insufficient manuring and consequent exhaustion of the land; this is indicated, amongst other things, by the fact that the virgin soil contains more potash than the cultivated.
2. Though phosphates and potash are said to have been used, the residue in the soil consists of the former only. This may indicate (*a*) insufficient potash has been used, (*b*) the phosphate has not been sufficiently available and has not proportionately benefited the plant. Superphosphate would be better than bonedust.
3. The manures most needed are potash and nitrogen.
4. The large amount of nitrogen in the soil apparently unavailable may indicate that the nitrifying power of the soils is low. I have been unable to investigate this point in this enquiry, but if this is so the addition of nitrogen in the form of nitrates

is particularly desirable. This of course should be added in the form of top dressing after the foliage has started and before blooming.

5. Though barnyard manure (well rotted) is that most generally recommended for strawberries, it is often advisable to replace it by chemical manures or by green manuring. The latter method does not receive the attention in this State which it deserves. If instead of planting this ground with a so-called rotation of potatoes* it had been used for a leguminous crop, to be afterwards ploughed in as green manure, I believe the soil would have been greatly improved.

The manure for strawberries most highly recommended from America, where the question has been extensively investigated, is as follows:—

1,140 lbs. Superphosphate
1,280 lbs. Kainit (or 320 lbs. Sulphate of Potash)
540 lbs. Nitrate of Soda.
—.—
2,960
—.—

This mixture analyses about 8 per cent. each of phosphoric acid and potash, and 4 per cent. nitrogen. It is applied at the rate of about 800 lbs. per acre. At local prices this would cost about £2 10s. to £3 per acre. It is recommended that this be added in two applications, the first before planting and the second drilled in at each side of the rows in the spring. It would probably be best here that the nitrate should be applied chiefly as a spring dressing. A note of warning is necessary here. Too much nitrate will produce much leaf growth but no fruit. Growers must see therefore that this is well backed up by mineral plant foods. With insufficient nitrogen, however, the growth is so feeble that the plant is not vigorous enough to make use of the potash and phosphoric acid which is at hand.

I have only endeavoured to point out some of the probable causes of trouble which have to be met. There are doubtless others to which attention has already been drawn, viz.:—

1. Loss by frost.—Probably it is not sufficiently known that those varieties which have their seeds deeply embedded in the berry are more frost resistant than those which have prominent

2. Need for renewal of plants.—This has been fully dealt with in Mr. Whittington's report.
3. Insect pests, also dealt with by Mr. Whittington.—The vigorous growth induced by the manurial treatment recommended above will do much to minimise the serious effects of the attacks of insect enemies.

To summarise my conclusions, I would recommend:—

1. Green manuring before plants are renewed.
2. Use of Superphosphate instead of Bonedust.

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* It is difficult to understand how this is expected to improve the land. It can only diminish the plant food without doing any good, except that due to deeper cultivation.

3. More liberal use of Potash. (The Sulphate or Kainit should be used, not the Muriate).
4. Dressings of Nitrate.
5. Renewal of plants every few years.
6. Choice of varieties for resisting frost, etc.
7. Systematic cultivation and attack on insect pests as recommended by Mr. Whittington."

HORSES FOR EXPORT.

By J. L. BURNS, V.S., Acting Chief Inspector of Stock.

The outbreak of hostilities in South Africa opened up an extensive trade in remounts for the Imperial Army, and I think it will be agreed that it was generally recognised that the Australian horses were possessed of more grit and stamina than any others, but that they had not the style of those which came from England and Austria. Appearance goes for something in the market. The misfortune all round in Australia is that we have no settled type of horse. Breeders are so infatuated with racehorses on the one hand and draught horses on the other that there is a great deficiency of animals of an intermediate stamp. It is not easy at present to obtain in these States the class of animal required. Under the system, or want of system, on which our horse stock has proceeded of late years, it would be nothing short of a miracle (and it is said that the age of miracles is past) and against the laws of Nature if we had the correct type of horse. It seems to me that, speaking generally, the Australian is content with the average "spavined," "legless," "formless," "ill-broken" "crock" we see in such numbers. First class blood horses are not common, and the general knowledge of horse flesh is formed from bad specimens. Half the horses we possess cannot be classed at all, they are neither one thing nor the other, but the majority may safely be placed under the heading of "weeds." We sadly lack substance with breeding. Then again, it is next to impossible to get a thoroughly sound, well-educated horse at the present time, and carriage horses seem to be things of the past, although big figures are always paid for them when they put in an appearance. It must be admitted that a man's education, when it comes to carriage horses, is not complete unless he has had an opportunity of studying this class of animal in one or other of the large centres of population in either Europe or America. A visit to London or New York to an Australian is always a revelation in horse flesh, and it is time well spent for the person about to embark in the breeding of horses for export. There is a great market for carriage horses not only in the Eastern States but in South Africa and India, where immense figures are paid for well-matched pairs. In connection with horses I myself have, during the past seven years, been six times to Natal and the Cape, also twice to Calcutta, and had the honour to accompany the South Australian Bushmen's Contingent, as Veterinary Surgeon, through the Boer War, so that I have a fair idea of what I am talking about. Both India and South Africa will take all the horses Australia can send them for some time to come, and pay a fair price into the bargain, provided the animals are sound and of the correct stamp, but not otherwise.

To enumerate all the causes which have brought about the deterioration of Australian horses would exceed the limits of the space at my disposal. The climate of Western Australia is suitable for horse-breeding. I am convinced that the influence of racing, as conducted at present, is one of the principal causes why the right sort of horse for general purposes is so hard to get and so seldom seen. Then the policy of some dealers is to buy in the cheapest market and sell in the dearest. The horse is not valued for his usefulness, but for his lack of usefulness, not for the work he can do but for his ability to win one or two short distance races, perhaps of five or six furlongs. In consequence weedy, sickly, quadrupeds who ought to go to the knackers are travelled about as "thoroughbreds" to the discomfiture of all who wish to see good and useful horses, and a farmer will pay 30s. for the use of a legless bag of bones under the name of a thoroughbred, who won't pay three guineas for a reliable sire. The worst of all sires is a weedy thoroughbred. Perhaps at one time racing improved the breed of horses, although even that is doubtful. But it does so no longer; that is certain. Speed is now everything, substance is sacrificed and the qualities, soundness, staying powers and endurance, at one time famous, have been bred and "improved" out of existence.

If we are going to make any headway in the breeding of horses nothing short of a £30 a head tax on all stallions of three years old and upwards racing on the flat should be imposed, and all sires of whatever sort advertised for public service should be registered after obtaining a Veterinary certificate of soundness from a Government official appointed for this purpose. No horse should be registered unless free from hereditary unsoundness. Unregistered stallions would then not long be able to compete with the registered ones, and as a consequence would soon leave the field. Then anyone about to purchase an entire would take care that the horse he selected was eligible for registration, and in a very short time about two-thirds of the mongrels at present in use would be deprived of transmitting their defects to posterity. The most even stamp of horse that I saw in South Africa during the war was the Austrian. This is a natural result of the great and intelligent interest taken in that country in the breeding of horses for some years past, both by the Government and private persons. The establishment of State stud farms in Austria and the immense, almost fabulous, prices paid by the Government for stallions has had a most wonderful effect in improving their horse stock. The sum of even £20,000 has not stopped them when it came to the purchase of a horse for improving the breed. The result of this policy I saw for myself one fine day upon examining some 700 head of horses at Beira just landed from Austria. These animals, all cobs, were simply pictures and it did one good to look at them. Firstly, they were of one type and all of one colour, viz., bay with black points. Their beautiful, well-bred appearance, the way they carried themselves, and their style and action caused them to be admired by all who had the good fortune to see them. With these qualities they had wonderful substance and there was not one of them not up to 15 or 16 stone. It simply goes to show what can be done by careful and systematic breeding, quite different to that carried on in Australia, where the average farmer deludes himself into the fancy that anything will do. I looked these Austrian animals over pretty closely and can honestly say that I could not find a single unsound horse amongst them, which I confess staggered me a bit after the difficulty I found in other parts of the world in finding a sound one. I do not think Australia, when I consider its many natural advantages, has much to fear from outsiders if the same attention is paid to this industry. The Argentine Republic, I think, will be one of the most serious and dangerous competitors in the horse market in the future as that country is now thoroughly awakened to the vast importance and possibilities of the breeding of horses, both for home use and for export. Many very valuable sires have gone to the Argentine, and I am informed, from a well-known gentleman who has made many voyages to that part of South America and who is himself engaged in the horse-breeding industry, that nothing will stop that Republic in the way of obtaining the best that money can purchase when it comes to horses. It will not pay us to sit down and let matters go from bad to worse. Then again, if we do in the end hit on the right stamp of horse we will have to educate him. An uneducated horse is no good to anybody, and I am afraid it must be admitted that at present the average Australian horse, from want of the merest rudiments of education, is about the most awkward animal in the world of his sort and a positive danger. It is as much as a man's life is worth to go near some of these brutes, although they are supposed to be what is called "broken." How different is the English horse in this respect. What a pleasure it is to have anything to do with him, to ride or drive him, or handle him in any way. These are points also of importance and will have to be attended to if success is to be ours. The whole subject is of sufficient concern to be taken in hand by every agricultural society in the State. If we are to secure a large portion of the export trade in horses we will have to start on a firmer foundation than at present exists in the country.

QUARTERLY REPORT ON RABBIT BRANCH.

By Alex. Crawford.

The first quarterly report of the Acting Chief Inspector of Rabbits has been received by the Minister for Agriculture, and is now published for general information.

"I took over the control of the Rabbit Branch about the first of December, 1906, and now present my report for the three months ending March 31st, 1907.

At the present time I have 1,439 miles of completed fencing under supervision, 715 miles being on the No. 1 or outer fence and 724 miles on the No. 2 or inner fence. This is officered by a staff consisting of one inspector, four sub-inspectors, twenty five boundary-riders, two teamsters, and two general hands.

There is one sub-inspector of rabbiters and 12 rabbiters employed in destroying rabbits to the west of the No. 1 fence.

From the reports received from the inspectors, it would seem that the fence is all in first-rate order, except where accidents occurred, at the end of March, through floods in the Murchison district, and the damage done there is being made good as speedily as possible, and should be all completed in a few weeks' time when this portion of the fence will be in better condition than ever, as in those parts where washaways are likely to occur, the bottom of the fence is being filled up with stone so that the under surface will not be washed away again.

My officers report that when the fence was being constructed nothing was done to prevent such accidents, either in the making of drains to divert flood waters or in putting stone in watercourses to prevent the soil from being washed out. This is being done now by this Department, and has added considerably to the cost that should represent upkeep alone.

It is also reported that in some places salmon gum posts have been used and these have been attacked by white ants, and are in such a bad condition that they will not be safe in another six months. The wire netting on the coast and for a mile or so inland is badly affected by the sea air, and will want renewing shortly.

The self-closing latches on the gates have not proved a success and are, in fact, dangerous, as persons going through swing the gates after them without waiting to see if they latch, which often they do not; and so the gates remain open a foot or so. Complaints have been received about these, not only from all our inspectors but also from settlers. On the No. 1 fence, where there are sliding latches that require to be pushed into place, there have been no complaints about the fence being left open. I have recommended that the self-closing latches be altered.

In the southern part of the No. 2 fence there have been a good many accidents through trees being blown down on the fence or falling on it through fires; in many cases the fence has been broken down with the ground, and it is quite possible that rabbits may have got through in such places. In the same district the fence has suffered severely through fires started by settlers when burning off and allowed to get away. We have had a large number of posts burnt and fencing destroyed from this cause. In some parts there has been considerable damage done by kangaroo-hunters lighting fires and letting them get away, also shooting through the fence and breaking it with bullets, and rushing kangaroos against it when chased by dogs.

I regret that in many cases the people for whose benefit the fence has been erected, through carelessness, have been the means of great expense to the Department and exposed the State to danger through letting fires get away when clearing and not attempting to repair, even temporarily, the damage done. In many instances the boundary-riders have been put to serious inconvenience through settlers and others taking the water from tanks, so that the men have often extremely long distances to go from one water tank to another, and on bicycles they cannot carry much of a supply.

The traffic on the fence has been considerably reduced and instructions have been given to the officers to report to the police to prosecute all persons found trespassing without a permit from the Department.

From the beginning of the coming quarter considerable reductions are being made in the staff, and the estimated saving of some three thousand pounds per annum in maintenance will take place.

The six rabbiters who have been employed trapping between the fences have been dispensed with, as it seemed useless to keep this small number of men working over an area of some 16 or 17 million acres of country with rabbits more or less distributed all over.

Settlers, on whose holdings rabbits are known to be, seem very loth to take any steps towards their destruction, and evidently expect the Department to do all the work for them.

Inspectors are now serving notices on such to clear off the rabbits, or it will be done by the Department at their expense.

In many places on the east of the No. 1 fence the rabbits are thick, so thick in fact that they have eaten up every green thing they could and then started barking trees and scrubs, and thousands have died of starvation and poison bushes.

I regret to report that there have been four cases of rabbits being found to the west of the No. 2 fence. The first case was at a place about 30 miles east or north-east of the Coorow, a station on the Midland line. Immediate steps were taken, and it was believed they were eradicated. Rabbit traces were then reported at a place about 44 miles north of Cunderdin, on the west side of the fence, and trappers were sent out and eight were destroyed. The next report came from Mullewa, and several colonies were said to exist there and that the rabbits had been actually brought there and turned out. This report is being investigated. The last report came from Lynton, about 30 miles north of Northampton. A rabbit was killed there and traces seen of other rabbits. The skin was forwarded to me. This is also being investigated. It is thought in the latter case that the rabbits have been brought from the Abrolhos Islands by boat.

I think the time is not far distant when there will need to be rabbit boards appointed to deal with the pest locally, and with that in view I have had a draft of a new Act prepared by the Crown Law Department making provision for such, and have submitted it to you for your approval. That will be the only way in which the matter can be dealt with, I think, satisfactorily.

There still remains, on the No. 1 fence, some 420 miles to be taken over which it is expected will be completed about July, and on the No. 3 fence some 160 miles. This latter fence runs from near Yalgoo, west to the coast, south of the Murchison River."

PUBLIC ABATTOIRS.

HOW THEY ARE CONSTRUCTED AND CONDUCTED AT SOME OF THE ENGLISH SEAPORTS.

By F. CLUTTERBUCK.

It would, I feel sure, be of much interest to the majority of subscribers and other readers of this valuable *Journal* to know what a most important institution is the Public Abattoir—with its refrigerators and sale-yards attached—to the community of any city, State, or country, and more especially so to the stock-raising portion of such communities. Because it is an undoubted fact that unless a city is provided and equipped with facilities of this description to enable the stock-raiser or the food producer to obtain the best possible price, by a fair and open competition of buyers, for the stock he has prepared for the market, those responsible, whether Governments or Municipalities, are failing in their duty towards that portion of the community.

To the minds of most people who have the interests of the agriculturist and the stock-raiser at heart, a city without its live-stock market and its public abattoir is as incomplete as it would be without its Cathedral or its University. And I am firmly convinced that if the governing bodies or the civic authorities of any State or city could only foresee the far-reaching advantages, commercially and otherwise, to be derived by establishing these facilities, for the benefit of the stock-raiser and the purveyor, and for the protection of the health of the public who are the consumers, they would be just as eager to commence the construction of these most essential buildings as they are to lay the foundation of a Cathedral or a University. The spiritual and the mental welfare of the people are well looked after, but their health and their interests in the matter of food supplies are very often forgotten altogether.

With these preliminary remarks, I would like to describe in detail the construction of one or two of the public abattoirs at which I spent some considerable time in England, and also give some valuable information concerning the manner in which they are conducted.

At a seaport in the West of England, called Avonmouth, they have a series of structures built, consisting of sale-yards, abattoirs, and refrigerators which, for mechanical contrivances, sanitary arrangements, and effective supervision, will compare favourably with any of the others I have seen. The order and arrangement of all business conducted inside these commodious premises is simplicity itself. The authorities who control these abattoirs, with commendable foresight, erected them close to the wharves of the harbour or docks so that oversea supplies as well as home productions could be centralised and controlled at the one establishment. The casual visitor is at once struck with the splendid isolation of these buildings; it is almost as difficult, unless one is a privileged person, to obtain an entrance to these places as it is to obtain access to a nunnery. The whole of the structures are enclosed by a high boundary wall for reasons which I will explain later on.

Landing and housing of cattle, sale-yards, etc.—England having, as most of us know, to depend largely upon importations, every twice or three times a week large cargo steamers arrive from America and each discharges about 500 head of cattle, besides sheep, into these abattoirs. Here, after a thorough inspection, the bullocks are tied up in rows of about 50 to the right and left of large covered-in sheds called lairs, and given a plentiful supply of hay and water. These lairs are built in such a way that every comfort is provided for the animals to ensure cleanliness and good health. Each shed is of oblong shape and is entered at one end by three doorways, each doorway having sectional doors to increase ventilation without diminishing security. The middle and largest doorway is for the entrance and exit of cattle; the smaller doorways at each side give entrance to a narrow passage leading to the other end of the shed, and is principally used by the cattle-tender. Here in this passage each animal faces you, tied to an iron post and protected by rails in front. Here the cattle-tender can feed a hundred or so cattle in a very short time, each getting an equal amount of food and its share of water, which stands in a trough in front of them. By turning a tap fixed at one end the trough is, in a few minutes, filled right along to the other end. The floor of each shed is made of smooth concrete, slightly sloping from the sides to about 2ft. behind the animals, where it forms a shallow gutter. The space between each gutter forms the centre of the floor of the shed. This also is of smooth concrete, about 10 or 12ft. wide, and raised a few inches above the lowest level. This provides ample room for safe inspection, and the moving about of the cattle. The roof of each shed is built somewhat high and in such a way that plenty of light and air enter without admitting the rain. The whole structure, except the roof, is built of good solid wood, tar painted on the outside and limewashed on the inside. Each shed is connected with the other by the aforesaid passages, so that practically they altogether form one large building. Some few yards distant and in a smaller, but similarly constructed building, are the sheep. These are divided off in pens, and fed, watered, and looked after in the same way as the cattle.

Every morning and evening the floors of these buildings are cleansed and hosed down with water; fresh straw litter placed under the animals, after which they are fed and watered. A chance visitor coming into the place on a tour of inspection, just when these attentions have been completed, could almost imagine, as he walked along behind the cattle and noticed their clean and sleek appearance, that they had been stall-fed there from infancy, instead of having probably the day before been landed there after a rough passage across the Atlantic Ocean.

Adjoining these lairs, and connecting with them by doors and passages, gateways and races, is a smaller building known as the sale-ring, provided for the sale of the cattle. A large portion of the floor of this building is in the form of an arena, with sides raised sufficiently high to protect the buyers who are ranged all around it on a sloping gallery. At one end a raised platform is fixed for the convenience of the auctioneer. From this point of vantage he can command a good view of the purchasers as well as the cattle to be sold. Directly opposite him is the gateway by which the animals are driven into the arena to be sold. This gateway is so constructed that when the animals leave the ring they go a different way back to their former stand in the lairs from that by which they came. By these means no confusion is caused; other cattle follow quickly into the ring and time is saved. They are sold in lots to suit all kinds of purchasers, whether in a small or large way of business. Each and every animal is correctly numbered by means of a painted label stuck on the bed of the rump before it enters the sale-ring, after which the purchasers usually scissor-mark them with their own private mark, to ensure identification. As soon as the cattle are all sold, or if needs be while the sale is on, each and every purchaser must obtain from the auctioneer a written permit or pass which states the numbers of the animals and the purchaser's name, otherwise no animal can be slaughtered unless such a pass is previously handed in at the manager's office.

Abattoirs and Refrigerators.—Some 20 or 30 yards distant from the cattle lairs the abattoirs are built and constructed chiefly of brickwork, well ventilated and lighted, and completely weather proof. In here all animals are slaughtered and hung up before taken away or removed into the refrigerator. The main entrance to each abattoir (at this seaport they have a series of small ones; at some ports one large slaughtering hall is built) is situated at one end with an exit only at the other end. To the right and left of each entrance and on the outside of it, a large wooden cage-like pen or pound is built. In here the cattle to be killed are driven, to await the time and pleasure of the slaughtermen. Immediately inside the entrance, and also to the right and left of it, the killing takes place in the usual orthodox fashion, all the necessary paraphernalia being close at hand. As soon as one animal has been killed and dressed sufficiently to raise it on to iron rails suspended from the roof, it is, by means of stout roller hooks, swung further away and another one takes its place. The floors of these abattoirs from end to end are made of smooth concrete, punctured with holes just where the slaughtering takes place, and slightly sloping from the middle to the sides where it forms a gutter with a drain sunk at each of the four corners of the structure. The inside walls, to a height of 12 or so feet, are cemented all round. On these walls and handy to the slaughtermen, hooks, rails, and hoisting tackle are fixed, also long drop-tables for cleansing the entrails. To the centre pillars which support the inside structure, water taps are fixed, hoses are hung, and large water tubs stand; everything to lighten the labour, save time, and ensure cleanliness, which considerably improves the appearance of the meat and greatly helps the inspector in his duties.

Every evening at 6 o'clock, when all slaughtering must cease, the attendants hose the whole place down with a plentiful supply of water. The total absence of lime-wash is a striking feature in the cleanliness of these abattoirs. I have seen as many as 300 carcasses or bodies of beef hanging up after a busy day's slaughtering, each one marked and labelled with the owner's name. Around and beneath, everything clean and free from blood or taint; scarcely a sign to show that a few hours previously each one had been slaughtered in the very place it hangs.

The exits at the other end of the buildings open out on to a long wide platform, by the side of which the railway track runs, so that, with very little handling, the meat can be moved from the abattoirs right into the meat vans waiting outside to receive it. From there it can be despatched to any part of the country the butchers may desire it to be sent. In this department it may interest you to know that the Railway Companies place no obstacle in the way of facilitating quick despatch, special meat trains running all night when required. It is a mere nothing for a large consignment of cattle or sheep to be slaughtered here one day and be trucked and despatched to the London meat market, a distance of 130 miles, to be sold the next morning.

Refrigerating Chambers.—Adjoining the abattoirs, and in a line with the railway platform, are the refrigerating chambers, both freezing and chilling. The temperature of both chambers is regulated by machinery, and each chamber is fitted up in such a way that almost any quantity of supplies can be received. The chilling chamber is of immense advantage to the butcher in the hot weather. Whatever meat that has been slaughtered and is not required for immediate use, can be moved by sliding hooks and rails into the cooling chamber to be taken out when wanted. Everything that goes into these chambers must be properly stamped or labelled for identification, as the authorities take no risk; and smaller parcels of meat, such as offal, must be placed in a large basket or other similar receptacle. Nothing that cannot be hung up is allowed on any account to remain on the floor, unless so placed in baskets, which the butcher must provide and label, otherwise the meat is refused admittance. This rule was strictly enforced to ensure cleanliness and prevent mistakes occurring. Frequently whole consignments of cattle and sheep were slaughtered and put into the freezing chamber to be forwarded to some other part of the country where prices were ruling higher and the demand greater than the local requirements.

Restrictions, Dock dues, Tolls, Fees, etc.—For all these benefits derived by the stock producers and the butchers charges of course had to be made, but were so nominal that they were only too glad to avail themselves of the advantages conferred at so small a cost. For the public health, restrictions had also to be enforced. These particular abattoirs, etc., are under the control of the Municipality. A manager and staff are in charge. The sender of the cattle or sheep pays all dock or railway dues, landing tolls, accommodation and housing fees until the animals are sold, after which time the expenses are borne by the purchasers. If animals are killed the same day as purchased, slaughtering fees only are charged. If kept longer, so much per day is charged for their keep, etc., until eight days have expired when they must be slaughtered. No animal can remain alive after a limited number of days from the time of landing at the abattoirs. No animal on any account can leave the abattoirs alive. This restriction is rigidly enforced by the authorities to prevent the spreading of any contagious disease which might perchance be imported. No person other than those connected with the vessel is allowed inside the cattle lairs during the time the cattle are being landed from the steamer. To enforce this rule a high wooden enclosure is erected right along the length of the wharf where the steamer discharges the cattle, and is approached from the lairs by a gateway in the middle. At each end is a gate which when closed extends right over the edge of the wharf. This method also prevents the cattle straying or escaping. No person, except a privileged one, is allowed inside the cattle lairs or abattoirs at any time. Needless to say, dogs also are not admitted; rings fixed into the outside wall with chains attached, where all dogs can be tied up to await the return of their masters. No animals can be slaughtered nor can any meat be removed, or taken away from the abattoirs, unless a written order or pass from the owners of such animals is previously given up to the manager at the entrance gates. By enforcing these rules and regulations where an extensive business is carried on, no confusion arises, mistakes are avoided, the whole commercial machinery, as it were, works smoothly and satisfactorily, and also safeguards the interests of everybody concerned.

The butcher knows that, even after paying all these incidental expenses before the meat arrives to his shop, the cost per pound is much less to him than it would be did these abattoirs not exist. The stock-raiser who periodically sends consignments of cattle or sheep to these central stock sale-yards and abattoirs to be sold to the highest bidder, is quite satisfied under the conditions governing the sales, with the price obtained. On the other hand, should the local markets be glutted for the time being, the freezing facilities enable him to slaughter the whole lot, and forward, per rail or otherwise, to more distant parts where the markets are firmer and the demand greater. In fact, the whole system of centralisation, when under Government or Municipal control, is so far-reaching in its all-round benefits to the community of any city or State in which these facilities are established, that only those who have had the pleasure of witnessing their methods, when in full swing, can realise it.

Methods of Inspection.—Naturally, where so many animals are brought together to be slaughtered for human consumption, the public expect their food supplies from these sources to be absolutely healthy and wholesome. For the protection of the public health in this matter, qualified meat inspectors are engaged in some of the largest abattoirs to carry on this work. At the Edinburgh public abattoirs a large staff, headed by a competent bacteriologist, is engaged; offices and a laboratory, where microscopic examinations can be made, are erected for their use, and their methods of inspection are very much the same as those adopted by the meat inspectors here in Western Australia and also in Melbourne. Nominal inspection and branding fees are charged, which are added to the slaughtering fees, so that the expense of engaging these guardians of the public health is more than counterbalanced by the revenue derived in fees.

And taken on the whole the establishment of these facilities fulfills for all time the purpose for which they were intended, viz., to benefit the stock-raiser, the purveyor, and the consumer, and to prove a source of revenue to the governing bodies who control them.

Much more could be written about the internal workings of these establishments, as regards the rules and regulations for the guidance and observance of slaughtermen and others employed, the daily disposal of refuse matter, the plant and machinery for dealing with the by-products and the destruction of diseased carcasses and their organs. All of which important matters of detail are, needless to say, both systematically and successfully carried out. In fact, so completely are the methods adopted for the immediate disposal of all noxious refuse, that nothing of the nature of a nuisance ever arises, and complaints from neighbouring residents are practically unknown.

STOCK AT WYNDHAM.

By A. Haly

The shipping of bullocks from Wyndham commenced on 7th March, when 480 were loaded by the s.s. Mildura which, I regret to say, was wrecked four days later on the North-West Cape and all the cattle perished. This has upset the cattle shipping considerably, as a month's delay occurred before Messrs. Connor, Doherty, and Durack could procure a boat to take the place of the Mildura, consequently all cattle being mustered inland for future shipments were put back. The next boat to load was the s.s. Kolya, and owing to the fittings on board not being properly erected great delay occurred in shipping the cattle, and as the day was very hot and the cattle on board in the lower hold were dying, the vessel had to put to sea leaving 40 head of cattle in the yard. I hear a loss of seventy-five head occurred on the voyage to Fremantle.

The wet season is now over and some 45 inches of rain have fallen in the last four months. This is one of the best wet seasons known here for years. Although the first shipments of cattle have been light (they were drawn from the coast country where cattle do better in a light wet season), the cattle from the inland stations, which will be shipped later, should be very good.

I regret to report that the heavy rains have been favourable to the propagation of the tick which is greatly in evidence, especially on the coast country where they are worrying the cattle greatly. I have noticed a few cases of tick fever in travelling mobs.

REGULATIONS FOR CONVEYANCE OF BULLS AND STALLIONS OVER THE RAILWAYS.

The following important regulations governing the carriage of bulls and stallions, when used for stud purposes, from place to place have been supplied by the Commissioner for Railways:—

Bulls and Stallions in horse boxes or cattle trucks; 5d. each per mile up to 100 miles, and 3d. each for every additional mile. Such charge not to exceed full-truck rates. Minimum 12s. 6d. When travelling for stud purposes from September to December inclusive, bulls and stallions will be charged at these rates, and mares at ordinary rates on the outward journey, but "free" return carriage up to 31st March will be given to the original starting point for a distance corresponding to that for which trainage was paid on outward journey, on condition that before commencing the outward journey and previous to commencing the return journey, a certificate for each animal shall be furnished when booking the animal. No charge will be made for foals not over six months old at mare's feet. Entires may be allowed to break their journey. When booked two or three in a box from one sender to one consignee and intended for stud purposes, they must be returned in the same way, or separate charges will be made.

A rebate of one-third of the charge will be made when bulls and stallions, sent for stud purposes, travel one way only by rail.

The foregoing in respect to bulls and stallions sent for stud purposes will apply to hacks sent with such animals for the use of grooms.

Charges on stallions sent a single journey (through goods) by rail for stud purposes are not to exceed those provided on page 117 of Coaching Rate Book for the same animals.

POULTRY NOTES.

REPORT ON THE NARROGIN EGG-LAYING COMPETITION.

By FRANK H. ROBERTSON.

The first egg-laying competition held in this State came to a termination on the 30th of April last, and considering the disadvantageous conditions under which it was run can be considered very successful for an initial effort, as will be fully explained hereunder.

New South Wales was the first State to inaugurate an egg-laying competition, which was commenced on 1st April, 1902, running for one year, and has continued holding competitions ever since. All the States of the Commonwealth with the exception of Tasmania have been holding similar events; the idea has also caught on in New Zealand. Our State was slow in making up its mind as to holding a competition. The writer had long since recommended that one should be held, and the poultry breeders of the State had long clamoured in vain, when suddenly, on the 3rd April, 1906, the order came that a competition was to be started at the Narrogin State Farm on the 1st May. This left but little time to get everything in going order considering the site chosen was on a ploughed field 160 miles away from Perth and four miles from the township, no material on the ground, and a scarcity of skilled labour.

That night (3rd April) the rules were drawn out, and telegrams sent away the next day for the necessary materials to erect the pens, 25 in number. However, by hard work, favoured with fine weather, the pens were ready to receive the birds by the 25th, and strange to say the first to arrive being the ultimate winners; all birds were in the pens by the 1st May. Nearly double the number of entries were received for which pens had been provided. A ballot was taken, which naturally disappointed many poultry breeders, the result being that the Government was induced to start, two months later, another and larger competition, which is now running at Subiaco.

It was a pity that such short notice was given to poultry breeders, as many had given up all hope of having a contest that season and had disposed of likely birds. There was no time to import pullets of proved laying strains from the Eastern States, and so far as I can learn every bird in the competition was bred locally, and from list of averages given it will be seen that our record of 158.53 runs close to the average egg yield of all competitions, viz. 161.91. One factor which tells against the average is the fact that two owners failed to replace two birds which died during the last two months of the competition. Five birds in all died during the twelve months, viz. two from ovarian troubles, one from internal tumour, one from roup, one from tubercle growths.

The writer was in personal charge of the competition, but unfortunately had to be frequently absent in other parts of the State, and had to leave students in charge, which broke the continuity of feeding arrangements. Such is not advisable when the best possible results are looked for.

Some valuable data were obtained as the result of this competition, particularly in regard to its financial position, and conclusively shows that fowls, if properly looked after, will yield a handsome profit over and above their cost of feed, even if it is all bought, which was the case in this instance, with the exception of animal food which was supplied for seven months of the year from sheep killed for use on the farm.

Cost of Feed.

The feed bill amounted to £54 8s. 2d. for the 150 hens for 12 months, and works out at an average cost of 7s. 3d. per bird. It is made up as follows:

	£	s.	d.	
Oats	4	4	11	at 3s. 4d. to 3s. 9d. per bushel.
Pollard	13	14	3	at 1s. 1d. to 1s. 4½d. ,,
Maize	2	15	2	at 4s. 9d. to 5s. 1d. ,,
Bran	8	18	8	at 1s. 0½d. to 1s. 3½d. ,,
Oil cake	0	13	2	at 8s. 6d. cwt.
Grit	1	17	6	
Meat and bone .	5	12	9	
Meat meal	0	19	6	
Wheat	12	19	7	at 3s. to 3s. 9d per bushel.
Barley	2	2	8	at 3s. 8d. to 4s. ,,
Lucerne chaff ...	0	10	0	
	£54	8	2	

This is rather dearer than in the Eastern States, but the prices realised for the eggs far exceed in value those of other competitions, as the records will show.

The eggs were sold chiefly by public auction or to one wholesale firm, and the price realised after deducting all charges, viz. railage, cartage, commission, breakages, amounts to £109 7s. 10d., and at the time of writing there are 250 dozen eggs in cold storage; these will bring a return of from 1s. 6d. to 1s. 9d. a dozen net, thus bringing the total receipts to £126, or a profit of £72 over the cost of feed.

The following are the average prices the eggs were sold at during each month, viz., starting from May, last year, 2s. 1d. a dozen; June, 2s. 2d.; July, 1s. 8d.; August, 1s. 4d.; September, 11½d.; October 1s.; November, 1s. 1d.; December, 1s. 4d.; January, 1s. 4d.; February, 1s. 6½d.; March, 1s. 11d.; April, 2s. 1½d. The average wholesale price works out at 1s. 6d. a dozen for the whole twelve months. But in selling our eggs it was found that, notwithstanding that their quality was of the first grade, they seldom reached the maximum prices given in the market quotations as published in the daily press; 2s. 10d. was the highest price our eggs realised in the open market, and that only on one occasion, viz. 7th May, last year. On making inquiries I found that it is only a very small number of eggs, and in small lots that reach the maximum prices quoted, and therefore such cannot be considered as the ruling price for eggs of the best quality. 10½d. was the lowest price received, viz. on 12th September.

Carriage of Eggs.

The patent egg carriers, which hold each egg separately between two bent wires, were found the best mode of sending eggs to market, but then care must be taken to see that no eggs touch the woodwork of the frame; this is prevented by bending the wires so that they clasp each egg. The breakages in transit are considerably reduced if the eggs are packed in this manner.

The loss from breakages amounts to 44 dozen eggs or about 2¼ per cent., this being the shrinkage from nest to market, and cannot be considered excessive considering the amount of handling and travelling entailed. The eggs were first sent by passenger train, costing 3s. for a 24-dozen box, 2s. for a 12-dozen case, but later on it was found that eggs sent by goods went at half the cost and carried with much fewer breakages.

THE RECORDS.

Position in Contest.	Owner's Name.	Variety.	Address.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	Total.	Average in Eggs per bird.	Market Value.		
																		£	s.	d.
1	E. E. Ranford ...	B. Lgn.	Carr Street, Perth	52	100	115	111	131	130	127	104	131	117	108	54	1,280	213·33	7	15	11
2	A. M. Neitschke	S. W.	Claremont ...	16	76	110	133	143	138	127	103	98	78	94	77	1,193	198·83	7	1	9
3	Mrs. A. Bristow	W. L.	Armadale ...	104	113	112	108	114	112	102	89	83	70	102	74	1,183	197·16	7	11	1
4	C. W. Johnson	W. L.	Osborne Pk.	63	98	100	83	102	102	103	103	109	74	102	93	1,132	188·66	7	3	5
5	Mrs. B. A. Dusting	B. L.	Leederville..	16	59	122	111	113	124	88	116	113	107	106	23	1,098	183·00	6	10	4
6	F. Piaggio ...	W. L.	W. Guildford	45	78	125	96	100	109	101	110	100	98	85	31	1,078	179·66	6	11	0
7	Aveley Poultry Yard	W. L.	Woodlupine.	32	37	70	81	119	125	101	127	123	86	88	76	1,065	177·50	6	6	3
8	A. H. Hilton ...	Buff Orp.	Cottesloe ...	76	84	92	120	112	106	95	77	77	60	77	57	1,033	172·16	6	7	11
9	Miss M. A. Parker	W. L.	Woodlupine.	13	64	97	99	106	106	103	108	97	90	63	52	998	166·33	5	18	5
10	Miss Buttsworth	S. W.	Cottesloe ...	102	51	103	111	92	97	68	54	87	67	89	66	987	164·50	6	5	2
11	Sparks and Binnington	Blk. Orp.	Cottesloe ...	19	62	85	94	114	98	97	79	74	65	85	83	955	159·16	5	16	3
12	A. F. Spencer ...	W. L.	Bunbury ...	19	55	121	88	104	101	100	82	82	87	63	30	932	155·33	5	10	5
13	F. J. Williams	W. L.	Subiaco ...	0	41	79	109	100	102	99	92	89	82	82	55	930	155·00	5	9	5
14	G. W. G. Lizars	S. W.	James Street, Perth	47	73	86	96	102	98	69	62	74	71	74	60	912	152·00	5	13	2
15	Adelaide Poultry Yards	R. C. B. L.	Gingin ..	35	56	69	94	98	90	89	93	71	60	76	58	889	148·16	5	7	11
16	J. D. Wilson ...	B. L.	Crawley ...	60	23	50	89	111	120	109	79	78	90	63	16	888	148·00	5	2	2
17	W. J. Craig ...	G. W.	Beverley ...	0	30	131	92	99	85	75	71	81	75	53	86	878	146·33	5	5	11
18	John Handley ...	W. L.	Korijekup ...	2	77	130	76	84	94	98	95	84	69	46	21	876	146·00	5	3	10
19	F. E. Tull ...	W. L.	Trafalgar ...	14	26	99	75	104	84	64	101	93	82	65	35	842	140·33	4	18	10
20	Mrs. C. J. Hood	W. W.	N. Perth ...	0	34	119	103	104	113	79	55	65	55	54	55	836	139·33	4	17	7
21	Perth Poultry Yards	Blk. Orp.	Victoria Pk.	0	59	101	62	99	107	77	72	88	65	63	26	819	136·50	4	16	0
22	O. C. Rath ..	W. L.	Harvey ...	4	29	34	69	105	111	90	100	96	70	34	24	766	127·66	4	4	6
23	R. G. Flynn ...	W. L.	Leederville..	15	46	71	62	106	105	90	84	87	53	33	13	765	127·50	4	6	8
24	G. Oneto ...	W. L	Cannington..	48	77	72	38	61	80	71	81	51	66	57	24	726	121·00	4	10	11
25	E. Krachler ...	R. C. B. L.	Bunbury ...	0	48	108	82	84	84	70	66	62	40	39	36	719	119·83	4	4	10
				782	1,496	2,401	2,282	2,607	2,621	2,292	2,203	2,193	1,877	1,801	1,225	23,780	158·53			

List of Prize Winners.

Greatest number of eggs laid in twelve months.—1st prize £10, Mr. E. E. Ranford; 2nd £5, Mrs. A. Bristow; 3rd £2, Mr. C. W. Johnson.

For first three months (Winter Test).—1st prize £3, Mrs. A. Bristow; 2nd £2, Mr. E. E. Ranford; 3rd £1, Mr. C. W. Johnson.

For the greatest market value of eggs.—1st prize £3, Mr. E. E. Ranford; 2nd £2, Mrs. A. Bristow; 3rd £1, Mr. C. W. Johnson.

For greatest number of eggs during last three months of competition.—1st prize £3, E. E. Ranford, 279 eggs; 2nd £2, Mr. C. W. Johnson, 269 eggs; 3rd £1, Mrs. A. Bristow, 246 eggs.

A Comparison with other Competitions.

The first pen's record (Ranford) was 1,280 eggs, value £7 15s. 11d. Other competition records are as follows:—1902—Hawkesbury: 1,113 eggs, value £7 0s. 3d.; 1903—Hawkesbury: 1,308 eggs, value £7 10s 4d.; 1904—Hawkesbury: 1,224 eggs, value £5 13s. 10d.; 1905—Hawkesbury: 1,411 eggs, value £6 5s. 6d.; 1904—Victorian: 1,313 eggs, value £4 19s. 11½d.; 1905—Victorian: 1,296 eggs, value £4 15s. 7¾d.; 1905—Rockdale: 1,461 eggs, value £6 8s. 1d.; 1904—South Australian: 1,251 eggs, value £3 14s. 1d.

The above records of leading pens at other competitions show that the values of eggs at Narrogin topped all others, and the egg yield compares very favourably.

Weight of Eggs.

The weight of the eggs from the various pens differed considerably, also at different seasons of the year they altered. The total number of eggs laid, which fell short of the regulation weight of 1½ oz., was 37. The rules stipulate that any pen, the eggs from which do not attain an average weight of 22 oz. per dozen after the first three months of the competition, to be ineligible for a prize. This was very unfortunate for the owner of the pen (Mr. Neitschki's) which laid the second greatest number of eggs, as they consistently weighed from ½ to 1 oz. short. They certainly were large birds and good, well-marked specimens of the breed (Silver Wyandottes), their one fault being small eggs.

The appearance of the Fowls.

As to the appearance of the fowls, taken all round they were a nice looking, bright lot, and arrived in first-class condition, with the exception of one pen which was not in good form, two or three of them suffering from roupy colds; but as they had come such a long distance it was considered inadvisable to subject them to another journey, especially as there was no fear of contagion as iron is between each run. They were attended to and soon got into good form. At the same time, no competitor should send birds to a competition which are the slightest out of the best health.

White Leghorns were by far the most numerous and were of all types. The small, active birds as a rule provided the best layers, but not always, as Johnson's pen were on the big side, one of them a large, handsome bird. This pen were strong, active birds, big eaters, and laid large eggs. Oneto's were the largest Leghorns, fine looking birds, but did not perform well.

Bristow's birds were rather small, fine in bone, square-shaped bodies, deep behind, fine texture combs which hung well over, very active, great scratchers, good eaters, and laid big eggs. Aveley pen—little active birds, far removed from the show type. Handley's birds were the most even lot in appearance. the prettiest pen of Whites, yet not large enough for show birds. Miss Parker's pen similar type to Aveley. Rath's were a nice looking lot of good-sized birds which did not lay up to expectations. Of the three pens of Brown Leghorns Wilson's were far the best looking, two or three of them being prize-winners at good shows. Ranford's pen were always in good condition, except during the last month. It was hoped that ,they would reach the 1,300 mark, and they looked like doing it, but during April they fell off, went into moult, and in the last nine days only laid six eggs. They are neat, active birds, on the small side, an even lot, good eaters, and not subject to broodiness. Dusting's good useful pen went broody once during the term, five being out of the pen at once, but soon got over it. They were all heavy in moult during the last month. Of the three pens of Silver Wyandottes Neitschki's were by far the best, uniform in appearance, large, well-laced birds, and rather tall. The other two pens were smaller and more blocky in shape. Buttsworth's was rather the better of the two as regards lacing and colour. The one pen of Golden Wyandottes were an even lot of large birds, very dark ground colour. The two pens of Black Orpingtons were of quite different types. Perth Farms—large, good type birds, an even lot, good dark eyes, but rather loose in feather. The other pen were smaller, not so typical, tighter in feather, and better layers. The pen of Buff Orpingtons was one of the most attractive pens, a nice, even coloured, typical lot, not large, but very consistent layers. The two pens of Rose-comb Brown Leghorns were neat little specimens of the variety, but did not uphold their reputation as layers.

The Broody Hens.

The broody fowls were one of the worries of the competition, and entailed a lot of work, as the custom was to remove all broodies every evening after collecting the eggs, and keep them in small exposed runs until the fever went off them, care being taken never to allow a broody to stay the night on her nest. Some hens went off the brood very quickly, but many of them laid a few eggs and got broody again. The brown egg layers were the most broody, but it is surprising what a number of Leghorns want to sit.

I should like to try the experiment of allowing all broody hens to sit for three weeks before knocking them off; it would save trouble and would be better for the health of the birds, and would probably not decrease the egg yield.

The Feeding.

The food given was plain, wholesome diet, such as the ordinary poultry keeper uses; no special condiments or spices were given. The only tonics used were Epsom salts and sulphate of iron, an occasional dose being mixed in the soft feed, as it was considered the birds required it.

The morning feed generally consisted of equal parts of bran and pollard, to which was added a little steamed lucerne chaff and oil-cake, or boiled or chopped melon, green lucerne, or boiled cabbage; the latter is very good. The mode of preparing same was to pass the green leaves through the chaff-cutter and give to the birds at mid-day, keep out the stems and stalks, boil them and mix in the mash together with animal food, which consisted of offal from sheep killed on the farm, viz. the head, liver, heart, lights, and blood; such was well boiled and then minced, also using the liquid. The quantity varied according to the supply, viz. from 4 to 6 lbs. of animal food per day. When fresh offal was not obtainable, dry meat meals were used.

The mash was served just warm, and placed on corrugated iron sheets, and the birds given as much as they would eat, the general custom being first to leave a moderate quantity before the birds and go round again once or twice and give extra to any which appeared to require it. If any failed to eat every particle, any remaining was removed. To get a good egg yield fowls must be well fed, but not with as much bran and pollard as they will eat; if such were continued for any length of time too much fat would be the result, and a poor egg yield; but if as much greenstuff is given as they will eat and a liberal supply of animal food, a good egg yield will be the result. Feed liberally, but if appetites go off, and the birds appear to lose vitality, reduce the feed and administer a good dose of Epsom salts. A kerosene bucketful was the general morning's allowance of mash, and was readily eaten when birds were in good form and laying well; but a sudden change to warm weather would often mean a decreased appetite.

Green feed of some sort was generally given at mid-day, and often a handful of oats to each pen in addition, if appetites warranted. For the last few months the mid-day meal consisted of shredded pie melon, to which was added a little bran and pollard.

The evening feed as a rule consisted of a handful of wheat to each bird.

Oats was also frequently used, and by way of a change a little barley or maize was used. The water tins were cleaned out every day, and a supply of shell grit was always kept in the pens.

In conclusion.

There can be no getting away from the fact that this competition has served a very useful purpose in providing a valuable object-lesson in poultry farming, and thus becomes of great assistance in forwarding this important but backward industry. It proves that we have good laying strains among our own home bred flocks, and that the question of best layers is not one of breed but of the productive qualities of certain strains or families, irrespective of what variety they are; for instance, we see Brown Leghorns winning easily, but that does not necessarily prove that Brown Leghorns are absolutely the best layers, because we see the same variety a good way down the list. Then take White Leghorns, they occupy third and fourth positions, then we see three pens of White Leghorns close to the bottom of the list. Looking at the financial aspect, the winning pen show a profit of £5 10s. 5d. over and above their feed bill; even the last pen on the list shows a profit of £2 0s. 6d., equal to 6s. 9d. a bird which, owing to the high price eggs fetch in Western Australia, is a fine profit, and leaves a splendid margin to pay working expenses. In America a dollar (4s. 2d.) is reckoned a first-class profit to work on, and poultry-keepers are well satisfied when they can get that return, yet we hear of croakers in this State, and plenty of them too, who say poultry rearing does not pay.

SUBIACO MONTHLY RECORD—APRIL.

[Commenced on July 1. To close on June 30, 1907.]

FOWLS.

Six hens in each pen.

Owner and Breed.	1907. April.	Total for ten months.
1. Sunnyhurst (S.A.), *W. Leghorn	106	1,361
2. A. H. Padman (S.A.), *W. Leghorn	72	1,204
3. S. Craig, *W. Leghorn	77	1,200
4. Ericville Egg Farm, *W. Leghorn	91	1,134
5. E. Garbett, W. Leghorn	78	1,118
6. E. Palmerston, W. Leghorn	70	1,103
7. Austin and Thomas, W. Leghorns	85	1,100
8. A. H. Padman (S.A.), *S. Wyandotte	102	1,087
9. J. D. Smith, *W. Leghorn	64	1,085
10. G. W. G. Lizars, *W. Leghorn	66	1,063
11. E. Fitzgerald, W. Leghorn	55	1,055
12. J. R. Parkes, Brown Leghorn	54	1,054
13. Ryan Bros., *W. Leghorn	40	1,053
14. Bon Accord, W. Leghorn	72	1,048
15. Bungalow Farm, Brown Leghorn	50	1,041
16. F. Piaggio, W. Leghorn	75	1,036
17. Mrs. McGree, *W. Leghorn	100	1,033
18. G. M. Buttsworth, *W. Leghorn	80	1,031
19. F. Whitfield, Brown Leghorn	36	1,020
20. J. W. Buttsworth, *W. Leghorn	79	1,009
21. Adelaide Yard, W. Leghorn	80	989
22. A. F. Farrant, Partridge Wyandotte	64	973
23. C. W. Johnson, *W. Leghorn	30	972
24. F. T. Rowe, *Black Orpington	80	964
25. W. J. Clarke, Brown Leghorn	6	956
26. Bungalow Farm, *W. Leghorn	55	939
27. F. Whitfield, *W. Leghorn	55	918
28. W. Snowden, Brown Leghorn	12	912
29. A. S. B. Craig, *W. Wyandotte	90	911
30. H. M. Kelly, *G. Wyandotte	76	899
31. E. Hutchinson, *Minorcas	69	893
32. W. Wade, W. Leghorn	76	892
33. Mrs. Hughes, *R. C. B. Leghorn	34	876
34. C. Attwell, *S. Wyandotte	50	864
35. O. K., *Black Orpington	61	855
36. L. Meatchem, *G. Wyandotte	80	855
37. B. Jones, *S. Wyandotte	64	852
38. Perth Yard, W. Leghorn	61	832
39. Geo. Bolger, *Black Orpington	57	831
40. R. G. Flynn, W. Leghorn	33	825
41. A. Snell, *Brown Leghorn	3	820
42. H. Jones, W. Leghorn	27	819
43. A. R. Keesing, Minorcas	17	816
44. J. W. Buttsworth, S. Wyandotte	75	806
45. R. G. Smith, W. Wyandotte	81	806

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* Male birds were placed in these pens on August 1.

FOWLS—*continued.*

Owner and Breed.	April.	Total for ten months.
46. E. A. Newton, W. Leghorn	47	803
47. J. White, Brown Leghorn	13	798
48. C. R. Roberts, *W. Leghorn	40	788
49. C. L. Braddock, S. Wyandotte	54	779
50. Honnor and Forbes, R. C. W. Leghorn	43	776
51. W. Snowden, S. Wyandotte	58	776
52. Glen Donald Yard, G. Wyandotte	63	776
53. A. Coombs, S. Wyandotte	59	757
54. F. Mason, W. Leghorn	37	755
55. Ericville Egg Farm, *Black Orpington	8	739
56. Mrs. McGree, W. Wyandotte	77	737
57. J. S. Miller, S. Wyandotte	41	713
58. C. Crawley, B. Orpington	2	705
59. Jas. Kirk, G. Wyandotte	62	693
60. H. H. Wegg, G. Wyandotte	48	680
61. H. M. Kelly, *B. Orpington	17	673
62. J. E. Redman, S. Wyandotte	62	670
63. A. Savage, Minorca	16	631
64. J. B. Pettit, S. Wyandotte	49	625
Total	3,579	57,784

DUCKS.

Four in each Pen.

Owner and Breed.	April.	Total for ten months.
1. R. A. Dusting, *Indian Runner	63	952
2. D. F. Vincent, *Indian Runner	58	818
3. Austin and Thomas, *Indian Runner	44	816
4. Adelaide Poultry Yard, Indian Runner	67	807
5. Ericville Egg Farm, *Buff Orpington	90	743
6. Bon Accord, *Buff Orpington	82	732
7. Miss E. Parker, Indian Runner	19	729
8. F. T. Rowe, Indian Runner	26	722
9. Aveley Poultry Yard, Indian Runner	46	712
10. A. Snell, *Indian Runner	3	704
11. E. A. Newton, Indian Runner	49	698
12. C. E. Close, Indian Runner	14	692
13. G. Stead, *Indian Runner	54	690
14. C. W. Johnson, *Indian Runner	40	683
15. S. Craig, Indian Runner	63	666
16. Perth Poultry Yard, *Buff Orpington	72	650
17. J. B. Pettit, Indian Runner	19	632
18. J. R. Parkes, Indian Runner	15	611
19. Mrs. Mellen, *Indian Runner	16	608
20. W. Snowden, *Buff Orpington	30	602
21. F. Piaggio, Buff Orpington	0	598
22. Sargenfri (S.A.), *Buff Orpington	40	520
Total	910	15,385

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* Male birds were placed in these pens on August 1.

REGULATIONS FOR THE CONDUCTING OF THE 3RD EGG-LAYING COMPETITION (Subject to Alterations).

To be held at the Quarantine Grounds of the Department of Agriculture, Subiaco, situated about one mile from the Railway Station.

Committee: Messrs. Durham, Stuart, Byass, Dusting, Kelly, Vincent, and Johnson.

The following rules are to be observed in the conduct of the "Egg-laying Competition" at the Quarantine Grounds of the Department of Agriculture, Subiaco:—

(1.) The competition to extend over the period from the 1st of July, 1907, to the 30th June, 1908, inclusive; competitors to deliver their birds at the Subiaco Farm between the 20th and 30th June.

(2.) Each pen to consist of six pure-bred pullets hatched since 1st July, 1906, and one cock or cockerel, and six pure-bred ducks hatched since 1st July, 1906, and one drake.

(3.) Eggs produced in the pen during the competition shall be disposed of by the manager of the competition, and the price fixed by the owner on eggs to be sold for breeding purposes shall not exceed £1 1s. per dozen. One-third of the proceeds thus realised shall become the property of the Department of Agriculture. All eggs not so disposed of to the public shall be offered to the owner of the birds at a fixed price, viz.:—

(*a*.) During the months of April, May, June, July, August, and September, the price shall be 2s. 6d. per dozen.

(*b*.) During the months of October, November, December, January, February, and March, the price shall be 1s. 6d. per dozen.

All eggs shall be taken delivery of by the purchaser at the competition ground. The time the eggs shall be kept before being disposed of shall be at the discretion of the manager of the competition.

(4.) Any bird found to be suffering from an infectious or contagious disease, when delivered at the Subiaco Farm, to be rejected and replaced by the competitor.

(5.) The manager shall reject any bird that is not a fair specimen of the breed entered, and such bird must be replaced.

(6.) One wing of each bird must be cut by the owner before forwarding to Subiaco. The wing will be kept cut during the currency of the competition.

(7.) Throughout the currency of the competition, in the event of a bird dying, becoming diseased, or incapacitated from laying, the competitor, on receiving advice to this effect, must replace it with another of the same breed, and in the event of the owner not promptly replacing a bird (or birds) such will be replaced at the owner's expense. In such cases the birds will be secured by the manager of the competition from the Government Farms if possible, and otherwise, from the most convenient source. All competitors outside the 20-mile radius of Perth shall be allowed to keep two emergency birds in a pen; such pen to be provided by the department.

(8.) Subject also to the provisions of Regulation No. 3, all eggs shall become the property of the Department of Agriculture.

(9.) Eggs under 1½oz. in weight or otherwise unmarketable not to be counted

(10.) Any pen, the eggs from which do not attain an average weight of 22oz. per dozen, after the first three months of the competition to be ineligible for a prize.

(11.) The competition to be decided by a total number of eggs laid by each pen of birds, subject to Rules Nos. 9 and 10.

(12.) The market value of the eggs from each pen to be recorded and prizes given for the greatest total value.

(13.) Prizes will be awarded as follows:—For fowls and ducks respectively:—

For the greatest number of eggs in twelve months:
1st prize, £3; 2nd, £2; 3rd, £1.
For the first three months (Winter test)—Greatest number of eggs:
1st prize, £2; 2nd, £1; 3rd, 10s.
For the last three months—greatest number of eggs:
1st prize, £2; 2nd, £1; 3rd, 10s.
For the greatest number of eggs each month:
Ten shillings (10s.) each month.

(14.) Records to be kept of the total quantities of the various foods consumed, and the average cost per head.

(15.) No competitor to be allowed to withdraw any bird until the termination of the competition.

(16.) Any competitor violating or failing to conform to these regulations will be subject to such disqualification as may be thought fit by the Under Secretary for Agriculture, on the recommendation of the Committee.

(17.) The Under Secretary for Agriculture's decision in all matters of dispute to be final.

(18.) Leg-rings indicative of competitor's entrance number will be provided.

(19.) Competitors must make their own arrangements for transit, and those within the Suburban area shall deliver their birds within the Agricultural Quarantine Reserve at Subiaco, and those outside the area shall forward their birds, carriage paid, to the Subiaco Railway Station, consigned to the Manager, Agricultural Reserve, who must be advised of the despatch of the birds. To prevent confusion the sender must mark his, or her, name plainly on the coop.

(20.) **Entries close at the Offices of the Department of Agriculture, on Tuesday, the 11th June, 1907, at 4.30 p.m., and must be accompanied by an entrance fee of ten shillings (10s.) per pen for each pen entered.**

(21.) **The number of the pens in the competition shall be determined by the Under Secretary for Agriculture, and should entries exceed the number decided upon, the list of competitors shall be determined by ballot: provided that in the event of any of the less popular varieties being entered, the Under Secretary for Agriculture, with the advice of the Committee, may elect to enter such without ballot: provided also, that the number of pens of each variety so admitted should be in proportion with any other variety entered.**

Forms of application may be obtained from the Department of Agriculture.

ANTIDOTE FOR POISON.

Mr. H. A. Fanning, who has given his address at "Spring Vale Farm," G.S.R., writes:—"Would you please forward me the antidote for Narrow Leaf and York Road poison, for horses, cattle, and goats, and state how much soda and Condy's crystals should be given in each case."

The matter being referred to the Government Analyst, Mr. Mann replies:—"Mr. Fanning has evidently had inaccurate information. Soda should never be used. It would be better, far better, if farmers were to apply to me for supplies of antidotes properly made up."

As Mr. Fanning's address was insufficient a reply could not be posted to him, but for his and others' information we publish directions for the application of antidotes, as follows:—

Treatment of Poisoned Animals through eating Poisoned Plants.

Directions for use of antidote.

As soon as symptoms of poisoning have been detected, or if poisoning is suspected, one or more tabloids should be crushed, dissolved in water, and administered as a drench. The water must be sufficient for drenching and may vary from a pint to a quart, or even more, according to the animal and the dose.

Great care must be taken that the substance is completely dissolved. **Small crystals are apt to remain undissolved and be overlooked in the dark coloured liquid. If swallowed, they may stick to the walls of the throat or stomach, cause intense irritation, and may kill the animal.** ***This is the***

only danger in the use of this antidote. If completely dissolved it is harmless, and can be administered with perfect safety even if poisoning is only suspected.

Doses for Animals.

The following are suggested—they may be exceeded slightly with safety:—

For Sheep	1 tabloid
For Pigs	1 tabloid
For Horses	1½ to 2 tabloids
For Cattle	3 to 5 tabloids

The above doses are for adults. For young animals the doses should be made proportionately smaller.

If after administration of first dose the symptoms return or increase, half doses may be given at intervals of (say) half an hour.

The animal should be kept as quiet as possible; any excitement or rapid movement will assist the absorption of the poison and decrease the chances of recovery.

Please report the result of any trials made to the undersigned.

NOTE.—This antidote has been practically proved efficacious with the York Road plant, and is also probably suitable for Box Poison. With other plants sufficient experiments have not yet been made and the result cannot be vouched for. *It is highly probable, however, that the antidote will be effective in all cases, and it can be used with safety.*

E. A. MANN,
Government Analyst.

Government Chemical Laboratory, Wellington Street, Perth.

SHEEP AND WHEAT.

By BUCOLIC, in the *Morning Herald.*

The following is a clear and instructive account of how a successful Victorian farmer manages his wheat-cum-sheep farming. His total area is 320 acres. It is subdivided into three paddocks, containing 100 acres each—the odd 20 acres being a home paddock around the farmstead. His rotation is fallow (with rape as a spring crop), a crop after fallow, and after the crop the land is allowed to revert to natural grass for a year, the grass being broken up the following year for fallow (with rape). Then a crop after fallow, grass after the crop, and so on as before.

In 1903 one paddock of 100 acres was drilled in on bare fallow, with 40lb. of seed and 80lb. manure, half super. and half bonedust, and the yield throughout went five bags to the acre. That paddock, after harvest, was then let lie out under natural grass, and the 1904 crop was put in on the 100 acres of land that had been fallowed the previous year. After sowing was finished, ploughing on the third 100 acres was then begun for fallow early in June and finished by the end of August. On this fallow 10 acres of rape were sown broadcast (4lb. rape and 1lb. mustard per acre) the last week in August. During the year he purchased 400 aged Merino ewes in lamb to Shropshires at 15s. each. From them 350 lambs were obtained, fattened and sold at 10s. each on the place. The ewes shore 5s. worth of wool per head, and then they were sold off fat at 17s. each. While fattening on the rape the sheep are described as having been greatly advantaged by having access to the natural grass paddock for a change. The following year (1905) the wheat paddock was let out to grass after harvesting the crop which gave an average of 22 bushels. The fallow land was cropped, and the grass paddock fallowed. On this fallow 50 acres of rape were put in. The number of sheep bought was now increased to 600, consisting of large-framed cross-bred ewes, five years old, in lamb to Shropshire rams. This draft of ewes was obtained for 12s. a head. From these 550 lambs were fattened off the rape, and sold at an all-round average of 10s. 9d. each. The ewes gave a return from the wool of 6s. each. The next year (1906) the wheat was sown on the previous year's fallow, the cropped paddock let out to grass after harvest, and the paddock that had been lying out a year in grass turned up to fallow, of which 50 acres were sown to rape. From 600 ewes, 573 lambs were obtained, two drafts of which (100 each) were sold fat off the rape as early as October 23 last at 13s. 6d. each, while the clip from the ewes reached 6s. each. The ewes, as they are now in their seventh year, are being fattened and sold, to be replaced by another purchase.

In respect to the remarks that these returns from the sheep might very well be regarded as satisfactory, the owner pointed out that the benefits to the land were equally important. His wheat crop for the past harvest averaged 23 bushels per acre for the whole of the 100 acres, and this he attributed to the cleaning and fertilising effects of the sheep, together with the manurial value of the rape. "It is," he said, "certainly a truth that a better wheat crop can be depended upon from a rape fallow than from a bare fallow. The rape seems to put more into the land than it takes out, at least so far as cereal growing is concerned." He further explained that his wheat crop even as late as November promised an average of not less than seven bags (between 28 and 30 bushels) but for the sudden decline in the yields that set in just before harvest, owing to heavy rains. He has determined to deep-stir his fallow land this year by crossing it after ploughing with the mould-boards and coulters off to a depth of at least 9in.

Going further into the question as to how a 320-acre farm can carry 600 ewes and their progeny, besides growing 100 acres of wheat, it is elicited that as each paddock of 100 acres has its regular turn alternately of one year a wheat crop, one year grass, and one year fallow with rape, consequently 200 acres are available each year for the sheep. Attention is directed to the fact that the paddock that is let out into grass each year after the crop does not account for all the grazing, as the sheep have other feeding resources in addition. Amongst these is the valuable stubble gleaning immediately after harvest, and after that there is a catch crop sown on the stubbles. The stubbles being really straw of considerable length, after the stripper has done its work, the roller is put over it to break it down, 50lb. of oats and vetches mixed are harrowed in early so that they come up with the self-sown wheat with the early autumn showers. This provides good grazing for the sheep right on from the beginning. This, it is submitted, is better than burning the straw, because during the year's grazing it all gets trodden into the soil, together with the sheep manure, as good humus-making and fertilising material.

Other additions to the feed resources are that the whole of the previous year's grass land intended for the following year's fallow is available for grazing right up to the time fallowing begins, besides the rape for fattening which came in after the fallow ploughing for the four months at the end of the year. Another source of feed for the sheep is in the "eating down" of the wheat crop in its early stages of growth. As the year's wheat crop under this system always goes in on fallow land, early sowing can be easily accomplished, and one of the things that all the best wheatgrowers have proved by experience is the advantage of early sowing. This, as a consequence, necessitates eating down, which promotes root growth during the winter, and also that valuable process in wheat growing known as "tillering." For eating down, nothing surpasses sheep, as they tread more lightly than cattle, and it is further pointed out that the sheep should be put in only for short periods at a time. All the sheep available should be put in at once, so as just to nip off the tops of the wheat plants, and be quickly taken out again, instead of putting in a few sheep and leaving them long enough to nibble the growing wheat too closely to the ground. This is described as important, as the advantages of eating down have often not only been neutralised, but actually turned into an injury by too close feeding.

SUGAR BEET.

In order to encourage the cultivation of Sugar Beet in this State, the Department of Agriculture imported a parcel of seed last year, which was distributed in August last amongst settlers for trial. From reports just to hand it would appear that while a good start was made, the seed germinating freely, showing a strong healthy growth, in nearly every case the whole of the crop was destroyed by caterpillars within a few weeks of the plants showing above ground. In two instances only were the growers enabled to mature a few roots.

The roots thus saved were obtained by the Department and forwarded to the Government Analyst for the purpose of determining the sugar value.

Mr. Mann having carefully analysed the roots, submitted a report as follows:—

I have examined several of the beets of different sizes with the following results:—

No.	Weight of Beet.	Percentage of Sugar.
1	40·9 ozs.	14·8
2	15·4 ,,	16·3
3	17·3 ,,	14·9
4	19·0 ,,	16·2

All the roots had withered to some extent, through loss of moisture since being dug. Only 72 per cent. of juice could be expressed from one of the beets, whereas in fresh beets it should be about 95 per cent. The loss of moisture thus indicated correspondingly increases the percentage of sugar. The results are, however, very good.

BEE KEEPING.

Recently Mr. John Sutton, of the Wingate apiary, S.W.R., visited Bullsbrook and gave a very lucid and practical demonstration on the working of the bee, in Mr. W. J. Leslie's Bullsbrook apiary. He took a hive to pieces and explained all that he did as he went along, and demonstrated the best means of attaining the most honey or profit out of that hive. The school children, along with their teacher (Miss Logue) attended, and took an active interest in the demonstration, about 20 attending besides the children. Mr. Leslie has about 50 hives, and there are quite a number of bee fanciers in the district. In the evening Mr. Sutton gave a most interesting lecture, in the Agricultural Hall, on "The Busy Bee," the hall being comfortably filled. Unfortunately, his lantern would not work satisfactorily, so we had to do without the views he had with him, which would better have explained his lecture. However, he made his lecture practical, and kept his audience fully interested right through. He began by contrasting the old method with the new, and how much the bee-keeper was better off through having his frame, hives, and all the latest appliances to make everything as easy as possible. He also fully described the inmates of the hive—the queen, the drone, and the worker—and gave in full detail the separate uses of each, the life of each, and their separate functions in the hive. The formation and use made of each of its members was explained at length. Mr. Sutton, who probably owns the largest apiary in the State, is a thoroughly practical man, and talks with his bees as with an old friend. It was pointed out by him how to go into a strange hive, into one of the worst hives, and not be stung, simply by stroking them down the right way, as he amusingly put it. Get one of the queen bees, he said, and handle it well before starting off, or at the beginning, and the other bees, scenting the queen, will not be of much trouble during the day. How to prevent swarming was another item he explained fully. This was stated to be the allotting off of the old queen, thereby preventing her from flying, and although the other bees may fly away, they will come back to find her, probably in another box or hive, so that she may start off again to form another colony. The hive from which the old queen had fled was put at another place, and so on during the swarming season. Honey was demonstrated to be an excellent article of food, and should be on everyone's table. In addition to being in itself a "whole" food, it was shown that, should one be compelled by circumstances, it would be possible to live solely on honey, which contained all the necessary elements to make a "whole" food. The bee was an useful adjunct to many producers—to a gardener or orchardist. To gardeners because of the pollen the bee carries and gives a better result in melons, pumpkins, etc., and vegetables of that description. To the orchardist because they helped to ripen the flowering buds in the spring of the year, more especially the apples and plums. The large imports of honey into this State were referred to, which it was claimed could be obviated by what Mr. Sutton termed intelligent bee-keeping.

STERILISED CHILLED MEAT.

Expectations were on tip-toe, says the *Meat Trades' Journal,* when it became known that Messrs. W. Weddel and Co. would put some of the chilled beef ex s.s. Pardo that had been created by the new Linley sterilising process on the market on Friday, the 18th ult. A very fine show of beef was the result, all of which sold readily. The Pardo landed on the 11th ult. at Southampton 481 quarters (for Messrs. Weddel, a small quantity compared with what is usual for them) and of which over 300 quarters were put through the sterilising chamber that the International Cold Storage and Lairage Co. has had fitted up at its own expense. After going through the process of sterilisation in the chamber for about an hour, they were removed, in the presence of Mr. H. Lardner (representing Messrs. W. Weddel and Co.), to one of the storage company's ordinary chambers, where they remained for a week, and 268 quarters were then railed to Smithfield, together with 74 quarters that had not been sterilised. The contrast in appearance between the "treated" and "untreated" quarters was most marked, the former being bright and clean, whereas the latter were showing palpable signs of rapid deterioration. The bulk of these were pitched at Messrs. Parker and Fraser's stall, which was visited by the *elite* of the chilled meat trade, who were one and all astounded at the result shown. Two each of the "treated" and "untreated" quarters were put on one side, and our representative inspected them on Monday, 21st ult., and found the former still bright and clean, while the others had developed mould and slime.

This is the first practical illustration of the treatment of a large quantity of beef under the new sterilising process, and the result must be eminently gratifying to the patentees, to the International Cold Storage Co.—whose manager (Mr. Alfred G. Granger) was quick to see the possibilities of the process to his company, and had it installed in one of their chambers—and also to Messrs. W. Weddel and Co., who, we understand, from the outset have taken a keen interest in the process.

These results will quicken the interest of the trade in the appearance on the market of the first parcel of beef that came home from the Argentine on board a steamer with its chambers sterilised by this process. We understand that the Anglo-Argentine Shipping Co. has decided to fit up the necessary apparatus on two of its new boats immediately, and that Mr. J. A. Linley, the managing director of the Improved Chilling Co. will, at an early date, proceed to the Argentine to superintend the shipment of the meat under his company's process.

AUSTRALIAN APPLES.

FRUIT PROSPECTS AT COVENT GARDEN MARKET.

The slackness of business in Covent Garden Market, which usually follows the Easter holidays, was abruptly dispelled yesterday morning by the arrival of the first consignment of Australian fruit, consisting of 5,000 cases of apples and a small quantity of pears from the s.s. Britannia. They were sold by auction by Messrs. Garcia, Jacobs, and Co., and other firms, and the scene in the great Floral Hall during their disposal would have put to shame Wall Street in a financial crisis.

The light-skinned Australian apple, which can scarcely be distinguished from the Tasmanian variety, is a very popular fruit, and there was vigorous bidding for the comparatively small supplies available, all of which realised good prices. Mr. Garcia informed a representative of *The Tribune* that the regular Australian fruit season will not actually begin until the arrival of the Orontes, which is expected to reach England on Sunday. Next week a flood of good Australian and Tasmanian apples will appear on the market, and the season will start in earnest. Owing to a poor crop in Australia the supply of apples will be particularly short, but the fine Tasmanian variety is plentiful and in good condition. The arrivals from Tasmania are expected to be in excess of last season's supply.

Fruits from the Cape.

A considerable amount of business is now being done in the market in Cape fruit, particularly in black grapes and pears, which are arriving in splendid condition. Mr. Garcia stated that there was a good demand for this fruit, and that the public are obviously appreciating its quality. He regarded the Cape fruit trade as exceptionally promising, and thought that if the refrigerating space on board the steamers was augmented, and the present heavy cost of transmission reduced, the extent of the dealings would develop rapidly.

The South African pears are selling retail in the market at 4d. and 6d. each, and the same price is paid for large, dark-skinned Californian pears.

One of the novelties of the market is the South African "apple plum." Without handling the plums cannot be distinguished from a dark-skinned rosy apple. When cut they are of a port wine colour. They are sold retail at 6d. each. Among oranges, which have not been good this season, the most popular variety are the large "Jaffas." In a few weeks the market will receive consignments of the noted South African Tangarine orange, which, although of the smallest, are so highly prized that they easily realise 4d. each.—*Exchange.*

EVERY FARMER HIS OWN EXPERIMENTER.

By H. B. M. Buchanan, B.A. (Cantab.), and J. J. Willis, Superintendent of the Rothamsted Field Experiments.

Every individual farmer knows perfectly well that nearly all land, no matter how well it has been farmed in the past, can, by the application of suitable manures, be forced to yield an increased crop. But the important problem for the practical farmer who has to make his own bread and cheese is this:—Will the increased crop give him a profit after he has paid for the extra cost of the manure, paid for the extra labour bill involved in its application, and also paid him something for the time and trouble that the whole operation has entailed upon him?

Let us emphasise what we mean in a more direct manner. Supposing that the extra cost of manure, and the labour of its application amount, we will say, to 25s. an acre, will the extra yield from the land so treated show a profit, say of 20s. an acre (after making the allowance of the aforesaid 25s.), over land that has been manured and cropped after the methods of every-day farming?

The practical farmer has further to consider this important point. Will the manures applied not only yield him an extra net profit in the present, but will they remain profitably in the soil, so that one or more succeeding crops will also show increased profits?

In other words, if the farmer applies extra capital to the soil in suitable manures, will he receive yearly a reasonable profit on his outlay?

Probably we are nearly accurate in stating that the average rental of our English farming land is about 20s. an acre. In some districts, where the land is of poor quality, the farm buildings old and inconvenient, the access to good markets more difficult and expensive, the rent is lower than 20s. an acre, but in other districts where these helps to profitable farming are more favourable the rent is considerably higher. But grouping the good, average, and inferior lands together, the average rent may be stated to be about 20s. per acre.

We are of an opinion that if advantage be taken of the best practical agricultural knowledge of the day, and that knowledge applied to the land in a skilful and practical manner by experienced farmers, the increased net yield over the average return would pay the average rental of the farming lands of this country.

In some few cases where farms have been skilfully treated for a number of years by experienced, practical, scientific, and up-to-date farmers —farmers who have taken the trouble to observe and note the results of carefully conducted and carefully recorded experiments, and who, by means of enterprise and a good headpiece, have varied these experiments to suit the especial requirements of their own farms, it would seem that for such pioneer farmers as these, in our present state of knowledge, their farming operations could not well be improved upon.

At the same time, even to these farmers we would just say this. Agricultural science and knowledge is as yet in its infancy, but each year's experiments, thought, and work that is now being carried on in the different centres of research, not only in the British Isles but all over the world, brings valuable additions to our accumulating knowledge, with an increasing knowledge of how to make the farm yield a more profitable result.

It is, we think, impossible to forecast what a more extended knowledge, practically applied by experienced and clever farmers, may not do to effect a greater and more profitable yield of their crops. What to-day may seem to experienced men an impossibility, may to-morrow become clear and obvious to the understanding of a child.

It is to be hoped that we shall not be held guilty of libelling the great majority of our farmers when we say that they are satisfied to grow their crops along the general lines of their forefathers—excellent lines mostly—but they do not follow sufficiently the result of experiments now being carried on in the different centres of research. Even if some few do observe for themselves the results of the profitable experiment, or read of these results in their agricultural papers, still fewer we are inclined to think take the trouble to apply the principles of the profitable experiment to their own farms.

We are not in the ranks of the army of croakers who state that the English farmers are behind the farmers of other countries in their farming operations. From our observation in the United States and Canada, and some other European countries, we are decidedly of an opinion that the farming lands of England, taking them as a whole, are better farmed than the lands of any other country that we have had any experience of.

The lands and crops are cleaner, more generously manured, the live stock looks healthier, better bred, and more wisely fed.

These observations are fully confirmed by the published crop returns of the countries of the world, and also by the fact that almost every country has to come to us, and comes to us in an increasing degree, carefully to buy pedigree live stock, and, moreover, has from time to time to still further import other high-bred animals, in order to preserve their breeds from degeneracy.

Although the average English farmer may therefore justly congratulate himself on his general methods of farming, there can, we think, be no question that if he were to take full advantage of advanced agricultural knowledge and applied it in a skilful and practical manner to the soil, he could make his own farm a more profitable concern.

But to do this he must combine with his admirable practical experience an inclination to watch and ponder over the numerous experiments now being carried on in the research centres, and should the investigation that he has been noting or reading about look like suiting his own particular farm, he must be prepared at once to try a similar experiment for himself at first in a small way, and if that prove profitable, to gradually extend its operations.

At first in a small way, which means that every farmer must be his own experimenter. That is the backbone of these articles. We appeal to the English farmers to carefully note the results of profitable experiments made elsewhere, and then to test these experiments for themselves on their own farms.

Because an investigation has been successful on an agricultural experimental farm, or in some centre of research, it does not by any means follow that it will be equally successful elsewhere. The soil, the subsoil, aspect, position of the land, its past history in cropping and feeding, are infinitely varied. The manures, their quantities, the methods of cultivation that may pay right well on your neighbour's farm may not pay equally well on yours.

The treatment of land as to manures and method of cultivation that may suit a particular field on one side of the hedge may not suit the field equally well over the hedge. And here it is that the farmer's knowledge and skill has a chanc to show its quality—namely, by adopting or modifying the experiment that has been proved to be profitable elsewhere to his own farm, so that he, too, may participate in the benefits to be obtained from such treatment of the land.

It may be that a farmer will have to modify the experiment, so that it may suit the especial need of his own farm.

As regards aspect, drainage, its methods of manuring, cultivating, cropping, and feeding, every cultivated field has its own especial history, and this past history no one can possibly know so well as the farmer, who for years probably has kept careful observation.

From a knowledge of his own land the practical farmer may think that a particular experiment will prove more profitable for his especial case if he add a little more of this manure and a little less of that, or he may think it more beneficial if he omits one ingredient altogether and adds some other ingredient, which his own observation has taught him that his land is deficient in.

It would be a wise step for a farmer to take, if from time to time he submit small samples of his soil to the public analyst, in order to be tested for such important foods as nitrogen, potash, phosphoric acid, and lime.

Afterwards he should test the accuracy of the report in regard to its practical value for his own farm by making small experiments, because, although a soil may show on analysis that it contains an abundance of nitrogen, potash, phosphoric acid, yet these may not be in such a soluble condition as the crops can use. Therefore, the farmer must not be guided by his analysis alone, but he must be prepared to ascertain the needs of his crops for himself by making small experiments. For example, a soil on analysis may be found to contain several thousand pounds of nitrogen, phosphoric acid, or potash, and yet the addition of 5 cwts. basic slag, or 2 cwts. kainit, or 1 cwt. nitrate soda per acre may make all the difference between a satisfactory and profitable crop and a crop which is a failure.

Should these small experiments made by the farmer himself prove to be successful and profitable, then the farmer would possess confidence that they would be still more profitable if they were extended to still wider areas of his farm.

If a farmer's mind has absorbed the general principles of manuring, so that they have become the A B C of his farming life, he will make the experiment of the scientific workers and the analyst's reports his guides only, not to be slavishly followed, but to be modified in part, or to be applied as a whole as he thinks would suit best the requirements of the land that he knows so well.

It seems clear to us that the future prosperity of British agriculture will very largely be determined by the farmers themselves. The soil must be skilfully treated in order that it may yield a more profitable return. And we venture to think that improvements will be found along the lines indicated:—First, in determining by actual experiment on a small area the needs of the land, and then in applying to wider areas those manures which experience and experiment have proved to have yielded the greatest profit.

The farmer who is doing his best to bring about a system of a more rational manuring of the soil is performing a noble, useful, and profitable work, both for himself and for his nation.

Even if we think we know our subject sufficiently, it is advisable, in order to strengthen our grip of it, that we should from time to time again more fully study its alphabet, to yet once again take up and read through the elementary primer, the simple text-book. The subject will by this means become more real and self-evident to us, more a part of our every-day working life. And if the beginnings of our subject be simple and connected in our minds we can acquire all further knowledge concerning it much more easily and with a much clearer insight.

There are really only very few principles in connection with practical manuring that the farmer need concern himself about. If his farming is to pay he has to see to it that his land contains a certain amount of humus, a sufficiency of phosphate, nitrate, potash, and lime. That the particles of the soil are surrounded with a plentiful supply of warm, pure air; that the soil holds a sufficient, but not an excessive amount of moisture; and lastly, but not least, that the soil is stored with healthy, vigorous germs of life called "bacteria."

If any one of these important principles is absent from the soil, or not present in sufficient quantities, the crops will suffer and starve. The soil may be rich in phosphates, and yet if the nitrates are absent, or not present in sufficient quantities, the crops will show a small, and therefore an unprofitable, yield. The same will hold true if the nitrates are present and the phosphates absent, or if both phosphates and nitrates be present in sufficient quantities and potash be absent, or if potash be present and phosphates or nitrates absent. Or the soil may be rich in phosphoric acid and nitric acid, and yet if there be not present in the soil a sufficiency of lime to enable the phosphoric acid to combine with it easily to form phosphates, or to allow nitric acid to combine with it to form nitrates, the crops will suffer.

Bacterial germs and a circulation of warm, pure air and moisture must also be present in rightful and healthful quantities if the important work of the preparation of plant food in the soil is to be carried on abundantly and readily. To increase the store of plant food in naturally poor soils, and at the same time to compel the soil to yield profitable crops is the problem set before every practical farmer.

How Phosphates are formed.

Phosphates are formed by the chemical union of the element phosphorus, with the gas oxygen, which union the chemist terms an oxide, and this oxide combines with moisture to form phosphoric acid, and phosphoric acid lastly combines with the lime of the soil to form phosphates, and phosphates, when in a soluble condition, can be taken in by the roots of plants, and is one of the perfected foods that all our crops require.

How Nitrates are formed.

There are two ways by which nitrates are formed.

1. Nitrogen gas combines with oxygen gas and forms an oxide, and the oxide combining with moisture forms nitric acid, and nitric acid combining with the lime of the soil forms nitrates, and nitrates, when in a soluble condition, can be taken in by the roots of the plants, and is another of the perfected foods that all our crops require.

2. When organic matters, such as animal and vegetable remains, roots of plants, stubble, and farmyard manure begin to decompose, its nitrogen combines with oxygen and forms ammonia gas; this ammonia gas combining with moisture through the agency of soil germs forms nitric acid, and nitric acid combining with the lime of the soil, forms nitrate of lime, or nitrates, which is one of the most soluble of plant foods.

Potash.

Potassium, like phosphorus, is never found in a free state in Nature. It is a constituent of many minerals. When united with oxygen in the proportion of two of potassium to one of oxygen, there is formed the potash of commerce.

Lime is necessary.

From the foregoing outline it can be seen that if phosphates and nitrates are to be formed in the soil, there must be present a sufficiency of lime to enable phosphoric acid and nitric acid to form phosphates and nitrates respectively. Lime is a necessary ingredient of every agricultural soil; without it plants cannot grow. Lime is not, however, usually considered a plant food in itself, yet it is a most important element of plant food, because it converts the insoluble and unusable plant food in the soil into a soluble and usable plant food. By its mechanical action lime corrects the damp and acid conditions so common to our clayey and marshy soils. It lightens and drains the heavier soils, and so allows a free access of warm air to circulate amidst the soil particles. Lime also enables the plough and cultivator to pulverise or break up the soil into a greater number of soil particles; in other words, it helps the mechanical implements to prepare a good seed bed or tilth and a good tilth is of the utmost importance if profitable crops are to be grown.

Lime also consolidates the lighter and more sandy soils, so that they are the better able to retain moisture and warmth. Lime further helps the crop to ripen earlier, and, above all, on our heavier soils it strengthens the straw of the cereal crops, so that they can develop a heavier yield of grain. By strengthening the straw the crops are better able to stand up against heavy storms of wind and rain, which otherwise would considerably "lodge" the crops, and interfere with satisfactory ripening, and add to the expenses of harvesting.

The miller maintains that lime in the soil helps the wheat plant to develop a harder berry—a berry richer in that variety of gluten which is so essential, from a baker's point of view, to ensure a good-looking, well-risen, digestible, and strengthening loaf of bread.

THE FERTILISER ACT.

By **Percy G. Wicken, Inspector of Fertilisers.**

The attention of settlers is called to the fact that under Section 6 of the Fertilisers and Feeding Stuffs Act it is imperative on all vendors of fertilisers to give to the purchaser an invoice certificate stating the contents of the fertiliser, in the prescribed form, which is as follows:—

Form "C."
WESTERN AUSTRALIA.
FERTILISERS AND FEEDING STUFFS ACT, 1904.
(Section 8.)
Invoice Certificate on sale of Fertiliser.

I (*name of seller*) . . . . of (*place of business of seller*). . . . . .hereby certify that on the. . . . . day of. . . . . , 190 , (*quantity sold*). . . . . .of the fertiliser known as . . . . .Registered Brand. . . . . .was sold by me to . . . . .and the minimum percentages of nitrogen, potash in readily soluble form, water soluble phosphoric acid, citrate soluble phosphoric acid, acid soluble phosphoric acid, and moisture contained in such fertiliser are as follows:—

—	Minimum Percentage.
Nitrogen	
Potash in readily soluble form	
Water soluble phosphoric acid	
Citrate soluble phosphoric acid	
Acid soluble phosphoric acid .	
Moisture ...	

Dated the . . . . day of . . . . , 190 .
(*Signature of seller or his agent*) . . . .

To protect their own interests, all settlers purchasing fertilisers should see that they obtain an invoice certificate in the prescribed form at the time of delivery, and if they do not do so, or if the certificate is not in accordance with the Act, they should communicate with the Under Secretary, Department of Agriculture, Perth, giving full particulars of the case. It is only by the co-operation of settlers in this respect that the conditions of the Act can be enforced.

The following list of analysis of fertilisers, made by the Government Analyst, has come to hand; the list is supplementary to that issued in the March issue of the *Journal.* The value of each fertiliser on a unit basis has been added for the benefit of those who wish to compare the relative value of any of these fertilisers.

THE ANALYSIS OF FERTILISERS.

	Number of Sample.	Name of Fertiliser.	Where obtained.	Nitrogen.	Water Soluble Phosphoric Acid.	Citrate Soluble Phosphoric Acid.	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.	Value on Unit Basis.		
										£	s.	d.
Guaranteed analysis	0101	Fison's Concentrated Fertiliser	W.A. Producers' Co-operative Union	5·011	5·139	0·458	1·191	6·688	2·512	6	13	11
Found by Government Analyst	0101	Do. do.	do. do.	5·99	6·16	2·98	*Nil*	9·14	2·46	8	0	7
Guaranteed analysis	0102	Super bone manure	Couch, Calder & Co., Welshpool	1·25	4·0	5·0	8·0	17·00	1·25	4	10	6
Found by Government Analyst	0102	Do.	do. do.	1·90	3·26	9·11	7·71	20·08	...	5	2	7
Guaranteed analysis	0103	Producers' Special	W.A. Producers' Co-operative Union, Welshpool	3·00	...	..	23·00	23 00	...	6	0	6
Found by Government Analyst	0103	Do.	do. do.	4·37	...	11·11	12·92	24·03	...	7	7	4
Guaranteed analysis	0104	Crown guano	Couch, Calder & Co., Welshpool	...	...	7·30	16·50	23·8	...	3	19	1
Found by Government Analyst	0104	Do.	do. do.	...	...	1·50	24·94	26·44	...	4	6	3
Guaranteed analysis	0105	Bonemeal	Paterson & Co., Fremantle	3·7	...	...	23·8	23·8	...	6	13	9
Found by Government Analyst	0105	Do.	do.	4·65	...	8·93	14·99	23·92	...	7	10	9
Guaranteed analysis	0106	Sulphate of potash	Gardner Bros.	...	...	...	...	...	51·8	15	2	2
Found by Government Analyst	0106	Do.	do	...	...	..	...	...	53·38	15	11	4
Guaranteed analysis	0107	Kainit	do.	...	...	...	...	...	13·0	3	15	10
Found by Government Analyst	0107	Do.	do.	...	...	...	...	...	12·68	3	13	11
Guaranteed analysis	0108	Potash manure	do.	...	...	...	...	...	30·0	8	15	0
Found by Government Analyst	0108	Do.	do.	...	...	...	...	...	27·50	*b*8	0	5
Guaranteed analysis	0109	Elephant brand super bonedust	Guthrie & Co., Fremantle	3·5	...	...	18·30	18·30	...	5	12	9
Found by Government Analyst	0109	Do. do.	do.	2·63	...	3·16	14·18	17·34	...	*ac*4	17	3
Guaranteed analysis	0110	Ohlendorff's superphosphate	Harris, Scarfe & Co.	...	16·75	...	...	16·75	...	4	6	6
Found by Government Analyst	0110	Do. do.	do.	...	17·24	2·03	Trace	19·27	...	4	16	1

a Below registered value in Nitrogen. *b* Below registered value in Potash. *c* Below registered value in Phosphoric Acid.

NARROGIN STATE FARM.

REPORT FOR THE MONTH OF APRIL, 1907.

By R. C. Baird.

The weather during the month has been hot and dry. The rainfall recorded was 64 points which fell on the 26th and 27th, and although insufficient, has proved beneficial to all the early sown crops which are now showing above ground. A good, steady downfall is much needed; it would greatly benefit the crops already sown and facilitate ploughing operations.

Seeding was commenced early in the month, and the following fodder crops have been sown:—Barley 25 acres, barley and rape 30 acres, rye 50 acres, field peas 20 acres, turnips 6 acres.

A mixture of grass seeds was sown with barley in a paddock of 14 acres. The grass seed was sown broadcast after the barley had been drilled, a light set of harrows being run over the ground to cover the seeds.

A patch of 6 acres, mostly sand, has been sown down with tall fescue.

Work in the vegetable garden has been proceeded with and a quantity of seeds sown, but owing to the absence of sufficient rain their growth has been retarded.

The fodder plants grown for experimental purposes have been greatly damaged by the ravages of parrots, and their value in consequence rendered almost *nil.*

A new fodder, "Mazzagua," has done exceedingly well, making a growth of about nine feet. I regret being unable to save the seed of this valuable fodder plant.

The pig-melons have given good results. This crop has been largely used for the pigs and poultry, and is much relished by them. The crop has now been taken up and stored for future use.

The stock is in fair condition, and with a good rain to bring up the young grass before the advent of the cold weather, should hold their own without extra feeding.

The horses, with the exception of two old mares, are in good working condition. The young foals are being fed at present and are doing well.

THE RABBIT INVASION.

The first line of defence against the invasion of the settled portions of Western Australia by rabbits is the pest-proof fence which commences on the south coast at Starvation Boat Harbour, and extends for a thousand miles north. This fence is to debouch on the coast at Banningarra, a lonely post on the bleak Ninety-Mile Beach near Condon. The work of six years will be completed in July, when the remaining section will be finished, and the State will then be divided by a line of netting, which must materially check the incursion of the pest. Through the southern portions of Western Australia the fence was comparatively easy of construction. There was an abundance of timber, no great transport difficulties, and the construction gangs had fairly inviting country to work in. Through the little-known Nor'-West, however, the work has been handicapped in many ways, and when the bill is presented to the taxpayers it will probably be found that the last section is the most expensive of all.

Some idea of the nature of the work in the North-West is supplied by Mr. R. J. Anketell, an officer of the Public Works Department, who has just returned to Perth after superintending the construction from the Oakover River, 697 miles north of Burracoppin, where the railway line crosses the fence, to the 840-mile, where the gangs are now at work. Mr. Anketell states that in the North-West the fence is erected on angle iron standards with wood posts as strainers, the two reasons for this being the absence of sufficient suitable timber, and the white ants. Naturally this means that all the material has to be transported from the coast—a task of some magnitude. All the netting and the iron is landed at Condon, and at present is being carted 250 miles to the fence. Forty camel teams, each waggon having 14 animals, are being used, and it takes anything up to two months for a team to carry five tons of material from the coast to the fence, the camels only travelling from 10 to 12 miles a day. For this the Government has to pay 2s. per ton per mile—about £25 a ton! Over the sand dunes, through the spinifex, and out along the fringe of the desert, these teams have been crawling along for the last two years, dragging hundreds of tons of expensive material with which the State is fighting the mild-eyed rabbit. The camel is no epicure—fortunately and unfortunately. He is quite capable of feeding himself from whatever grows along his track, but he swallows young spinifex, which is good, and the narrow leaf poison, which isn't, with a total disregard for their respective stomachic properties. When he fills himself up with poison he resigns his mission on the fence. If he is caught in time with only a modicum of poison in him, he waits for a dose of permanganate of potash, which the driver pours into him to the accompaniment of many oaths, while the beast froths at the mouth and looks as sick as only a poisoned camel can.

"We used to lose a lot of camels this way," said Mr. Anketell, "until Mr. Mann, the Government Analyst, discovered that permanganate of potash was a good antidote for the poison. Up there we have to be very careful still. The country is covered with poison bush. We hand-feed the horses, but we have to tie the camels up at night and muzzle them by day when we are working along the fence where there is poison. That cure is a great thing though, and lately we have not lost a beast. I have tried it on horses, too, and it has cured every time. We have 400 camels on the job, in addition to 150 horses, 50 donkeys, and five bullock teams—enough to stock a station. The natives? There are hundreds up there, but they never interfere with us. We have as many as 80 or 100 men in the camps, and there's not likely to be any danger. No, the natives don't hurt the fence, and I have never heard of any cases of wanton destruction, so that's one trouble we haven't to contend with."

It is pleasing to learn from Mr. Anketell that the rabbits are not making much headway into the pastoral country. "I did not hear of any of them being about," he said, "and the first traces I saw were at the Oakover River. No, the rabbit has made very little progress along the fence to the north during the last twelve months."

"The only difference in the construction of the fence up there and the sections lower down," added the superintendent, "is that we use the iron standards, and over the sand ridges we use 48in. netting and sink it a foot in the sand. The fence is not so stable as the timbered sections—it has more elasticity, but it will last longer, I think."

"The present is the best season the pastoralists in the North-West have ever had," said Mr. Anketell in reply to a concluding question. "Right through the country, so the reports say, there is plenty of feed, and even out in the desert the spinifex is six and eight feet high. There is plenty of water about, and that is one thing we have never been troubled about. There are wells all along the fence at intervals of about 12 miles, and good water is being drawn from an average depth of 50ft."

THE COLD STORAGE OF LAMBS AND FRUIT.

At the last regular meeting of the Northam Agricultural Society the following interesting address on the value of cold storage was delivered by the Hon. the Minister for Agriculture, and published in the *West Australian*, from whose columns we reproduce it:—

The President (Mr. Thomas Wilding) was in the Chair, and considering that it was holiday time, there was a good attendance. After the usual introductory business had been disposed of, the Chairman called upon Mr. James Mitchell, Honorary Minister for Agriculture, to address those present upon the subject of cool storage, which, he remarked, was a question that greatly concerned the future of the agricultural industry of Western Australia.

Mr. Mitchell, in replying to the invitation, commended the Northam Agricultural Society for the attention it was devoting to this important matter. The provision of cool storage for the purposes of an export trade was not of local, but of national interest. The question was to be viewed, not only as a State affair, but as part of a great Australian industry possessing a marvellous future. The advent of the refrigerator had opened up great possibilities for agricultural enterprise in the Commonwealth. It was right, therefore, that the agriculturists of Avon Valley should take the keenest interest in the question.

The Duty of the State.

Considering the possibilities ahead of cool storage in Western Australia, it was only natural that the Government should be actively interested in its developments. Proposals had been made to the Government with regard to various cool storage schemes, and the matter had received careful consideration. While the conduct of the various refrigerating and export enterprises might advantageously be left to private enterprise, there was no reason why the State should not afford some measure of assistance to them. He hoped that the day was not far distant when there would be cool storage conveniences installed at all the important ports from Wyndham to Albany. At the present time Victoria and the Eastern States were enjoying remarkable prosperity. Money was almost going a begging at 4 per cent. in Victoria, and he had been credibly informed that owing to the difficulty experienced in placing it at that rate large amounts had been sent home for investment. The probabilities were that money was cheaper in Victoria to-day than it was in any part of the world.

The Boon of Export.

The Victorian farmers were receiving practically the same prices for their grain as obtained in Western Australia, and on the whole their crops were not superior. Yet there was no disguising the fact that the agricultural industry of the East was thriving under yields that did not leave a great margin of profit to the producer of Western Australia. The explanation lay in the ready market that existed for all the Eastern agriculturist could produce, and in the large export trade that had brought him into direct touch with the great consuming centres of the old world. Cool storage, in enabling him to sell his perishable products in London, had brought prosperity to the farmer of the Eastern States. This state of affairs had not been unnoticed in Western Australia, and it was tolerably certain that this year there would be a fairly large number of frozen lambs sent away from the State.

Why talk of Exporting?

From Australia only the best of lamb was sent to London. The people of the Commonwealth, so far, seemed to rest content with the second quality. The frozen lamb imported into Western Australia from the East was of inferior quality. This fact made things difficult for the local producers. Their prime mutton and lamb came into direct competition with an inferior frozen article, which could be sold very cheaply. The consequence was that the prices obtained by the local growers were not what they should be. Owing to this fact there would probably be a curious position created this year. Large quantities of prime lamb would be sent out of the country at a time when heavy importations of inferior frozen lamb were coming in. The cry might not unnaturally be raised, "Why talk of exporting when the local demand is not yet overtaken?" While it was undoubted that there was a surplus of lamb during the season, the probabilities were that taken throughout the year the production of mutton and lamb was not in excess of the demand. Still, so long as the people were content to eat an inferior article—and so long as the local prices were on the basis of that inferior article—it was only to be expected that the growers of good lamb would attempt to send it to the market where it commanded much better returns. After all the transaction represented a financial advantage in this respect, that 4d. would be realised for an article that could be replaced by a satisfactory—if an inferior—substitute at 3d.

Where the Refrigerators should be Erected.

He had discussed this problem of cool storage with many people who had had experience in refrigeration. At his office he had been interviewed by persons from the Eastern States who had a close knowledge of the subject. They all agreed that the provision of proper cool storage facilities was essential to the full development of the agricultural industries of the State. The information they supplied him tallied with the conclusions he had already reached. For the frozen lamb trade the first works would naturally be erected at Fremantle. It was important that the abattoirs and cool chambers should be close together, and that both should be handy to the jetties where the export steamers could be berthed. In South Australia the Government had erected their abattoirs and other export conveniences at Dry Creek, some few miles out of Adelaide. The disadvantages of this arrangement had been apparent, and it was significant that the Government were about to erect an entirely new establishment close to the wharves at Port Adelaide. Whatever the State assisted in Western Australia should be up-to-date. The freezing and export conveniences which they were prepared to subsidise must embody all that was latest and best. On this principle North Fremantle would seem to be the right position for the cool chambers and abattoirs necessary for the proper conduct of the local frozen lamb industry. At North Fremantle there was plenty of room, railway facilities, and deep water, with shipping conveniences already in existence.

The Butter Industry.

Associated with the cool storage problem was the butter industry, which had only been made possible on a large scale by the aid of the refrigerator. He referred to an article appearing in Saturday's *West Australian*, where a Victorian expert gave it as his opinion that agriculturally this State was where Victoria had been twenty years ago. This had struck him as being a very sound contention. When he visited the Eastern States some years ago he called at a large central butter factory in Adelaide. Thanks to the courtesy of the South Australian Government, he was armed with a map of the agricultural districts, having the average rainfall marked against them. He called at this butter factory every day for several days, and ticked off on his map the centres from which the cream cans had been sent. He found that cream was regularly being supplied to the factory by farmers living in a district with a rainfall like Kellerberrin.

Their consignments of cream were sent down by train, and not even in a cool storage car. If such results could be obtained in arid districts like Orrovoo, of South Australia, there was no reason why they could not be repeated over large areas of this State.

The Central Butter Factory.

He found this central butter factory in Adelaide receiving regular consignments of cream from districts two and three hundred miles distant. In his opinion this was a much better system than the establishment of local butter factories. The larger the output the lower the cost of production, and consequently the better the price which the farmer obtained for his article. Moreover, the presence of the factory in the centre of a large town was a great convenience to the grocers and others who sold butter. They simply rung up the establishment on the telephone, and the quantity required was from time to time—perhaps several times a day—brought to their shops frozen hard, and in splendid condition. In this State the Government favoured the central butter factory idea. It was their intention to offer such inducements as would lead to a suitable establishment being opened in Perth. The matter had been carefully considered, and the details of the Government proposals would shortly be made known.

Mechanical Milking.

Mr. Mitchell referred to another important development that promised to revolutionise dairying practice. The milking machine, which had given such satisfactory results in the Eastern States, the Government had decided should be introduced into Western Australia. The Department of Agriculture had already acquired one, and sold it to the firm of Gull Brothers, dairymen, of Bellevue. Mr. Arthur Gull, after some experience with the plant, had expressed a very favourable opinion of it. He stated that he had by himself machine-milked 46 cows in the same time that two men hand-milked 40. As the reports of the process were so satisfactory he had decided to assist representative dairymen in different districts to instal them. There would be no gift made, but the men selected would be allowed a little longer terms than they could expect from the agents. In return they would be required to give information and particulars of their working, in addition to allowing those who wished to inspect them an opportunity to do so.

The Fruit Industry.

Cool storage also promised many advantages to the fruit industry. Such fruits as apples and pears could be maintained in the cool chambers for many months, and yet retain their flavour and freshness. A Bridgetown grower had recently asked him to arrange to place two hundred cases of apples in cool storage for him, and he hoped the day was near at hand when the practice of sending fruit to the cool chambers would be largely resorted to. By this system the orchardist could avoid the periods of gluts, and avail a favourable opportunity to sell. The refrigerator would thus advantage all sections of the community. The grower would benefit by being able to avoid over-supplying the market; the consumers would gain from the fact that regular supplies at fair rates would always be available.

Three important industries—meat-raising, dairying, and fruit-production—depended largely for their future upon the adequate provision of cool storage conveniences. It was thus apparent that the refrigerator was destined to play an important part in coming agricultural developments. For this reason the Northam Agricultural Society was quite right in taking action in the matter.

An interesting discussion thereupon ensued, culminating in the acceptance of a motion affirming the desirableness of the Government taking prompt action in the matter by the provision of adequate conveniences at Fremantle. A further resolution to the effect that a committee be appointed to report as to the opening that existed for cool storage facilities on a small scale at Northam, was also agreed to. This proposal, it was made clear during the discussion, has as its object the cool storage of Northam perishable products for the goldfields trade.

UNNERVED HORSES.

There is hardly any veterinary subject about which more misconception exists than that of nerving or unnerving—neurotomy or neurectomy, as the operations are variously termed—which are undertaken for the purpose of restoring lame horses to usefulness for a time. To Professor Sewell, one of the fathers of veterinary science, belongs the honour of having discovered this operation, although others professed to have performed it previously, but had not made it known. It was he "who first practised it and recommended it for incurable foot lameness," says Professor Spooner in his work on the "Foot of the Horse." "Like all other discoveries," says Professor Spooner, "it has met with asssailants from all quarters, both in the profession and out of it ; and not a few of them have been owing to the careless and indiscriminate manner in which many practitioners have performed it." The effects of such careless selections remain, two generations later, in the very general prejudice against an operation which we shall endeavour to show is a most humane one, and in the majority of cases adding years of usefulness to the life of an animal otherwise unfit for work, and ill at ease when unemployed.

Unnerving was first adopted in navicular lameness, a very much more common trouble fifty or even twenty years ago than it is now, and for several reasons. Coach horses and roadsters generally were heavier, and were required to do longer and faster journeys with greater weights than is now the case. The practice of cutting out the soles and trimming away the frogs undoubtedly favoured, if it did not actually cause, first contraction, and then disease of the sensitive structures within. The diminution is also due to the substitution of wood for stone sets in town roads (whereby concussion is greatly reduced); improvements in shoeing with rubber and other substances; and, greatest perhaps of all, a widespread knowledge of the hereditary nature of the lameness. Until Turner, Percival, Spooner, Sewell, and others proved by unnerving that "grogginess" was caused by a disease in the foot it was generally assigned to the shoulder—an easy error to fall into, having regard to the short or "groggy" step which characterises what we now know as navicular lameness. Mares so affected were put to the horse as a means of paying their way while taking a long rest. Now it is quite a rare thing to find anyone breeding from such subjects.

For other lamenesses of the foot, besides navicular joint troubles, neurectomy is also practised. Experts cannot always discover the exact pathological condition; whether it is connected with the shuttle joint, the insertion of the tendons into the little bone which gives the name to the disease (navicular), or concussion in the bone itself, leading on to ulceration, either of its substance or of the articular covering; indeed, it is not always apparent on post-mortem examination whether the disease began from within or from the surface of the bone, and every degree of change or degeneration of structure has been noted, both in the bone and tendon which play under it during life. Cases there are, too, of diseased wings to the pedal bone; these nearly always occurring on the inside, and having, perhaps, some connection with the presence of corns which have grown out with proper treatment of the foot. The latter form of foot lameness differs in some respects from navicular, in not shortening the stride to the same extent, and in evincing no improvement when the patient is warmed with excise. Ossific growths or deposits, as ring-bone or side-bone, causing continuous lameness; despite the oft-repeated blister, the firing-iron, and the long rest, may justify a final resort to the knife, for the division of the sentient nerves, supplying them with the capacity for pain. Of late years, another neurectomy, known as median, has been much practised by Professor Hobday, Mr. Henry Gray, and others, for the removal of lameness due to causes above the foot. The median nerve is a large trunk, found under the arm, and supplies with sensation much of the limb below the knee; hence its division is sometimes practised for incurable lameness occurring below that joint; but above the foot, in which latter it is not necessary to divide so large a trunk, the plantar nerve above the fetlock being the usual branch operated upon, or in some other cases, where the seat of lameness has been localised to one heel it has been found sufficient to perform what used to be known as the low operation, on the side of the foot, near the lateral cartilage so familiar to many readers as the place of side-bone. For incurable spavin and other hock lameness in hind limbs neurectomy is also resorted to, but with less success than attends similar performances on the front limbs, and for the reason that branches of other nerves endow the parts with some portion of their sensibility.

Having spoken of the relief of pain and removal of lameness as the usual result of unnerving, we may consider the objections, general and special. The operation is frequently spoken of as cruel. When chloroform was not employed, and tourniquets were not applied to make a "white" operation, it certainly did seem cruel, when one watched a man groping for the nerve in a pool of blood for a considerable time before he could carry out his intentions ; but no such charge can be sustained against the modern method of total anæsthesia, and a bloodless operation performed in a few minutes. One may well ask if the charge of cruelty may not with greater propriety be applied to the man who keeps a horse at work which is always uneasy and frequently in acute pain !

Those who have not ridden and driven many unnerved horses are apt to declare them unsafe, more liable to come down, and give their reason for this by stating what is an undoubted fact—namely, that the animal has no feeling in his feet. Spooner states the case well when he explains that " as the motion of the limbs is effected by means of the contraction of the muscles, and there are no muscles below the knee, there are no motor nerves, only sentient ones." The foot is operated by pulleys (tendons and ligaments attached to muscles above the knee), and an unnerved horse quickly learns that it does not hurt him to lift his leg high, and to put his foot down fair and square ; and it is the writer's experience that the tender-footed animal (while suffering from navicular lameness) at once or very quickly regains his original action, unless he has lost mobility by adhesion in other joints or parts of the limb, and from other causes than that for which he was operated upon. There are men who declare they can recognise an unnerved horse by his action, but there are many more who have ridden and driven them without suspecting any unsoundness ; equally good judges, be it understood. There never was feeling in the hoof, and a sound horse (or an unnerved one) should be as unconscious of having any feet as a sound man is of having a heart—all the time the feet of the one and the heart of the other perform their respective work satisfactorily.

A general objection to an unnerved horse is the more or less known risk of his becoming absolutely useless at any time ; but is not the comparison, in the mind of the objectors, as between a sound animal and one so operated upon ? Such a comparison is not fair. The animal upon which neurectomy has been successfully performed must be compared with the cripple for whom no other remedy could be prescribed. The risks are many, and somewhat in proportion to the judgment of the man who decides on operation, and the stage of disease at which it is undertaken. An unnerved horse may be pricked in shoeing, or pick up a nail, or receive other injury to his foot without evincing pain, and, through neglect of such treatment as other horses would receive, may lose his hoof. If the prick or the festering corn is discovered, it may be successfully treated, because the foot is not " dead," as some are heard to say ; on the contrary, feet deprived of sensation usually grow much faster than they did before, and for the obvious reason that they again take their full duty in supporting the weight of the animal. This after-growth often leaves a margin of safety for nailing, in cases where an operator may hesitate to advise neurectomy. Where operation has been too long postponed, and degenerate tendons exist, the sudden extension proves too much for them, they give way, the heel fills, and the toe turns up, and nothing more can be done to postpone the journey to the kennels. Animals with weak low heels, with corns or shelly feet, should be rejected as unfit subjects for neurectomy ; but those with upright " blocky " feet, with plenty of nailing room, offer a fair prospect of continued usefulness when unnerved. Some die of old age without developing any of the sequelæ above referred to, and others give but poor return for the outlay, and it would be difficult indeed to estimate the average life of an unnerved horse.

Some get their quietus through being blistered for some subsequent leg trouble, and with the result that the limb undergoes gelatinoid degeneration.—*Harold Leeney, M.R.C.V.S.*, in *English Live Stock Journal.*

TURKEY-RAISING.

One has but to walk through almost any stubble-field in any of the States to realise that there is a large proportion of the grain going to waste upon the ground. Cannot this grain, which has escaped the stripper by the angle at which the stalk and head lie, or else been shaken from the ear at first contact with the stripper combs, be put to some direct use and converted into cash? To lie thus on the ground means complete waste of actual life-giving food to man, beast, and bird. The prospect of recovering something therefrom during the next season in the form of a self-grown crop possibly has a few advocates in the mallee and similar wheat land. But such style of farming is not to be recommended. Land which is nominally lying fallow should not be allowed to be performing scratch duties by exhausting its energies over this class of catch crop. In the old country, especially in the North of England, one is accustomed to see huge flocks of geese ranging over the stubble. This stubble is, of course, of that short nature which results upon reaping, as distinct from the residue after stripping. The proportion of grain shed on the ground, or of ear and stalk lying thereon, is infinitely less than in Australian wheatfields. And yet great effort is made in the old country to put the waste to some direct use. The gleaner is quite a feature of the closing scenes which precede harvest thanksgiving, and has ever been treated—usually they are women and children—with an almost sacred compassion, from the days of Biblical history and of Ruth, the prototype of all gleaners, downwards. There is, however, much grain shaken out of the ear by wind and weather. To gather this and convert the food into flesh, and flesh into money, droves of geese are employed. They are brought over by boat to the North of England from Ireland, and on being landed are driven along the main roads literally in droves, just as we in this country are familiar wih the process of travelling sheep. Drafts are sold from the main flock to farmers alongside the road, and the geese themselves have their feet toughened for the roads by being driven across alternate strips of tar and sand. This has the effect of attaching a very effective artificial sole to the base of the foot, and enables the bird so provided to walk scores of miles along hard, flinty roads, without any risk of becoming footsore.

In New South Wales almost every farmer and selector provides himself with a flock of turkeys. They are to be met with of an evening perched up in rows along the dead branches of timber which lie all over the paddocks, as well as about the farm buildings. In South Australia, notwithstanding the vast annual waste which occurs in the grain paddocks, remarkably little effort is made to gather up the waste and convert at least a portion thereof into the form of turkey flesh. The majority of farmers' wives and daughters will bewail their want of luck in rearing turkeys, and catalogue their list of failures for years past. With the exception of places like Martindale, in the Lower North, and Yalluna, on the West Coast, where the bronze-wing turkey has been established in large numbers, one rarely meets with the turkey in numerical strength anywhere. The demand for turkeys as an article of diet is not restricted as much as is the case with the goose to one season of the year; they are marketable and edible at any time of the year, and for that matter all the year round. Some sort of prestige, in most cases the direct result of high prices, reduces the appearance of the bird on the table to Sundays and festive occasions. That there should be money in turkeys would, on the face of values asked by the vendor poultryman, seem undeniable. Prices have never been known to sag, nor the bird to be sold retail over the counter otherwise than by the pound weight. If sold at per head, one may rest assured that the vendor knows to a nicety how much each bird will weigh.

There has been no lack of experiment at raising turkeys among the ranks of all who pay some form of attention to ordinary poultry. Where, however, a want of success has attended preliminary efforts, the real reason has seldom been sought or thought out. The experience of the successful can be turned to advantage by novices, and much of that discouragement which is the customary rôle of the beginner removed by copying these precedents. The turkey requires to be raised under conditions which approach as nearly as possible the wild state. The breeding stock requires wide range, over rough land, where rocks and bushes abound, and trees are few. The hens make their nests in the bushes according to their own sweet wills. When one has begun to lay, a stake should be set up to mark the spot and the eggs should be gathered each day. When a hen becomes broody, let her have a clutch of eggs. After hatching, the young should be penned and cared for until three or four weeks old, after which all can be turned out into the paddocks. Here, where the pasture is rough, they will pick up a fair living off insect life, especially of the grasshopper order, and any scarcity of natural food can be subsidised with a little grain, fed three or four times a week. Confinement of the young chicks in close coops is about as fatal as exposure to wet. When hatched early, the chicks do not get draggled, through the wet grass being too long, and the hen is the best shelter from rain if the brood is not too large. Young turkeys need little food. Stale bread chopped fine, with an equal quantity of green stuff, fed on a pile of gravel or sharp grit, is an ideal food. Too much food has killed more turkeys than too little. Plenty of fresh air is absolutely necessary to success. The young should be taught to roost with the old birds in the open, so that they can have plenty of air. They are better disposed on fences and on dead timber than in any fancy type of poultry-house, either ancient or modern. Turkeys are extremely susceptible to the same diseases as chickens, hence it is unwise to mix them. This is contrary to the practice on many farms, where all the poultry run together. While the young are very tender, and require much attention, the older ones are extremely hardy, and well able to take care of themselves when ranging at large. In-breeding and breeding from immature or weak stock are fruitful causes of disease, though about the most aggressive method of promoting disease is to keep the birds for a considerable time on the same

ground. Liver trouble, known as black-head, appears to be the principal disease from which they suffer, but this seems more the result of an attempt to over-domesticate the bird. Of wild ancestry, the turkey does not need coddling, and the more freedom it has, and the nearer to natural conditions it is kept, the better it thrives. The reason that turkeys fail on many a farm seems to lie in the fact that they require entirely different treatment from the other farm poultry, and in a majority of cases do not get it. Domestication threatens to thwart all natural instinct of ranging abroad, scavenging, etc.; in the Indian Runner duck this faculty will soon be lost, but with the turkey the instinct seems to remain, but the bird itself dies.

AT FOALING-TIME.

Hints upon the management and treatment of the brood mare at foaling-time herewith submitted are by an experienced horse-breeder:—

When near foaling, bring the mare in at night, so that she can be watched, especially young mares on first and second foaling. Cleanliness is most important. Everything about a mare should be clean and pure. The foaling-box well away from drains or manure heaps. The mare and foal at this time are most susceptible to absorb impurities into the system, and blood-poisoning rapidly follows. The attendants should have thoroughly clean hands. Joint evil, which is very fatal to foals, can often be traced to unclean handling of the umbilical cord by the attendant. Clean straw should be used, and plenty of it. Good roomy boxes are best, so that the foal can walk about and take exercise.

First signs of foaling is waxing of teats two or three days before. Udder becomes full and hard; position of foal alters. Abdomen becomes more pendent, and points of hips fall. Wax drops off and gives way to milk. Mare looks anxious and moves round box. Looks round at her flanks; gets up and down with care; breaks into perspiration; ultimately lies down when labour comes on. In ordinary course the foal is born in ten to fifteen minutes.

Mares at foaling time are most anxious to foal alone. If there is any difficulty assistance must be given. It must be carefully given, and force avoided. First see two forelegs are straight and equal in the passage, with head between them. When head and elbows have passed through, the rest of the body comes quickly. When foal is born remove envelope which covers the head, and free mouth and nostrils. The umbilical cord should be tied and cut two inches from belly of foal. Tie with carbolized ligature and then cut. When properly done there should never be an enlarged navel.

The mare should be allowed to lie until she gets up herself. The foal should be taken round to her head, when she will commence to lick it—this dries the foal and brings on circulation. The foal then struggles to get up; this should not be interfered with, as it expands the lungs and exercises the muscles. The foal should not be lifted on to its legs. It should not be forced to suck until it is able; it is well able to wait for an hour or so. When able to stand it may be supported beside the mare, and its head directed, but never forced, to suck. A little milk drawn into the hand, when nose is close to udder, will often induce it to suck.

It is most important that the foal should get the first milk itself. When teats are small and difficult for the foal to get hold of, it should be carefully guided to the udder. When mares are irritable or vicious they should be held or tied up, forefoot held up, or even twitch put on, until the foal has confidence and the mare allows it to suck freely. If foal's bowels do not act within an hour after birth, remove contents of rectum with the finger, on which a little oil or vaseline is smeared; rubbing with soap is also good.

After foaling, give the mare a nice warm mash of bran, or a warm drink, but avoid flour drinks. The afterbirth usually comes away in half an hour to two hours; when mares foal before their time it is longer. It should not be forced or pulled away unless it remains too long; then a veterinary surgeon should be employed. Mares should be kept in at least three days after foaling. They should not be let out when the grass is wet, as the faol may lie down and get a cold. Mares when let out with foal frequently gallop about until the foal is heated; it then lies down exhausted and gets a chill, which turns to inflammation of the lungs or joints. This should be watched and prevented. When there is too much milk for the foal, and the udder becomes gorged and hard, the mare should be milked twice or thrice a day until the foal is able to take it all.

With regard to service after foaling, the ninth day is the usual time. This, however, varies; sometimes it is the eighth, while others go to the tenth or eleventh day. The horse should not be forced on her simply because it is the ninth day. If the horse is not taken, then she will run to the twenty-first day. Many never get in foal till the twenty-first day. If forced on the ninth day they often prove barren. The fifteenth day is not of much consequence; it is often the ninth day not passed off. The twenty-first day is the most important, both as a trial and a service day. Mares in good health, having had an easy foaling, if served on the ninth day, may be considered in foal if they successfully pass the twenty-first day. With delicate mares, or those who have had severe or difficult foaling, the twenty-first day is the proper one, as the generative organs have had time to recover tone.

Mares not stinted on the ninth day usually come well in season on the twenty-first day, and stand to their service. It is important to try young mares in their twenty-fifth days. The thirty-first is the next important day on which mares should always be tried; if the mare passes the thirty-first day it is a strong indication that she is in foal. She should, however, be again tried on the forty-second day; if the mare passes this successfully she may be considered safe in foal. Many mares break at sixty days, in which case the first service has generally been cast. To summarise, the chief days for service after foaling are the ninth, twenty-first, twenty-fifth, thirty-first, forty-second, and sixtieth.—*The Leader.*

PIG RAISING INDUSTRY.

SCOPE FOR DEVELOPMENT.

The raising of pigs is an almost indispensable adjunct of successful farming, says the Melbourne *Age*. It is especially so in connection with dairy farming, as it forms the most profitable means of utilising the skim milk, which forms so large a by-product of butter making. Pig raising, however, has not kept pace with the progress of the dairying industry, and there should be great scope for its further development. The number of pigs slaughtered and killed for pork and curing in 1904 was 164,745, the value of which, reckoning them at an average of £2 each, was £329,490. This number appears to be only about one-eighth more than is required for local consumption, as our exports for the year, almost exclusively to Western Australia, did not exceed a value of £40,000. In 1903 Canada's export of pork, ham, and bacon amounted to a value of £3,000,000, or just half the value of its exports of butter and cheese. Denmark's exports of pig products for 1904 were valued at £4,500,000, in this case again just about half the value of its exports of butter and cheese. Victoria's butter export for 1904 was valued at £1,694,100, so that if the pig raising business had progressed in the same ratio as it has done in the two countries named our export trade in bacon, ham, and pork should have reached a total of at least £800,000, or 20 times what it is at present. It is true the output has been somewhat reduced by the prevalence of swine fever during a considerable period of the past two years. But that experience has no doubt taught the farmers a profitable lesson. Swine fever and other porcine ailments are simply due to the lack of proper sanitation. If pigs are kept under healthy conditions there is not the slightest occasion for them to contract disease. If every farmer bred his own pigs the matter would be in his own hands; but under the system which obtains at present the fattener as a rule is not the breeder, and is consequently dependent to a large extent for the health of his pigs on the source from which he obtains them. The pig is a grazing animal, and for the first six or seven months of his life, if he is intended to be sold as a baconer, he should have a run in a well grassed paddock. The cost of feeding will be lessened, and the animal will grow amid healthy surroundings. The dairy farmer, especially in the districts where the soil is rich, and the land therefore more valuable, reckons it more advantageous to keep his paddocks for his cows, and buy his pigs at the stage at which they are ready for the fattening sty. Hence the division between the business of breeding and fattening.

It is admitted that the breeding of pigs has reached a very high state of perfection in Victoria, and that the climate and other natural conditions are eminently adapted for the industry. It is also evident from the prices ruling in the pig market that it must be a very lucrative business for the grower. The question then arises—What are the prospects of developing the output ? Canadian bacon is quoted in the London market at 56/ to 60/ per cwt., or 6d. to 6½d. per lb. The wholesale price of the best brands in Melbourne is 7d., so that at present prices in the local market there does not seem much probability of developing an oversea trade in that direction. The local demand is so active that it keeps up the prices, from which it would appear that if pork, ham, and bacon were cheaper the local consumption would considerably expand. Cheaper production, however, must also precede any great expansion in the oversea markets. There is no reason why the Victorian farmer should not be able to produce pigs quite as cheaply as his Canadian and Danish confreres, and thus command markets which would open up a practically limitless demand for his porcine products.

In the course of conversation with a representative of *The Age*, a leading Melbourne bacon curer remarked that Western Australia was the only outside market Victoria had got for its surplus pork and bacon, and if the people of that State began to supply their own requirements prices would have to come down. Pigs were now costing him at the ruling market prices 5d. per lb., which was an unprofitable price for the curer, as he was selling bacon at 7d. per lb. The pig trade had greatly changed during recent years. At one time herds of 20, 30, 40, and 50 pigs might be seen grazing in the paddocks of the Western district. Now every inch was of so much value for dairying that cows had taken their place, and the farmer, instead of growing his own pigs, was a buyer of stores, which he fattened with milk and pollard or grain. He did not consider this was favourable to cheap bacon, as the dairy farmers had to pay such big prices for the stores that by the time they had paid for the cost of feeding them up, 5d. per lb. gave them nothing. The most useful and profitable pigs for the bacon curer were those ranging from 120 to 140 lb. They should reach this standard by proper feeding in nine months. While growing, pigs should have grass; a lucerne paddock would be sufficient without anything else, but a pig should always have sufficient food, and six weeks or two months before he was sold as a baconer he should be fed on skim milk, with pollard, English barley, peas or wheat. Porkers should weigh about 80 lb. For export as frozen pork they should be obtainable at 4d. per lb. to sell in London at 6d. But pigs had not touched 4d., except in a very few instances, for many years. Both in quality of pigs and in excellence of curing Victoria could hold its own against the world, and if pigs could be bought at 4d. per lb. there was no doubt a large field for the expansion of the export trade to the United Kingdom, South Africa, and the East.

PLANTS AS SOIL INDICATORS.

It is important that a farmer, in order to be guided in the treatment of the soil on his farm, should have a good idea of its general character. Is the soil amply supplied with lime or deficient in this important constituent? Could it be classed as a fertile soil or is it becoming impoverished?

These are questions that many a practical farmer has asked himself, and sometimes to obtain information a sample is sent up to a chemist for examination. But soil analysis cannot be considered as affording, as a rule, satisfactory guidance. The crops themselves, to a careful observer, supply more trustworthy information, but perhaps the most reliable indication is furnished by the weeds that grow in the locality.

In the trade circular issued this season by Lawes Manure Company there is a very interesting article on this subject by the Rev. M. C. H. Bird. A friend sent him specimens of two weeds, asking for advice as to the best means of eradicating them from his land, and inquiring what idea might be formed of the soil in consequence of their profusion. One plant was the Rest Harrow, and the other Fleabane. The latter flourishes in a waterlogged soil, and therefore suggests the necessity of drainage; the other is an inhabitant of barren wastes, and indicates a poor soil unretentive of moisture. Thus from the prevalence of these two plants some conclusion may be arrived at concerning the composition of the soil where they abound.

Different species of plants require different habitations and different foods, or plant foods in different proportions, to flourish, hence different plants abound and luxuriate in different localities and in different soils and, therefore, knowing from observation what soils suit certain plants best, we are able to argue back, to a certain extent at any rate, as to what the quality and condition of the soil is in which we find peat-loving, chalk-loving, clay or sand-loving plants growing profusely. Thus, then, it is more or less true of all plants growing in a natural state that they are "soil indicators," and from the special weeds of a district the farmer may be guided in his methods of soil culture. For instance, few land plants can stand stagnant water at their roots, therefore when we find any of those plants that can flourish in such circumstances, such as wild mint, cuckoo-flower, horsetails, fleabane or coltsfoot, growing in "health and plenty," we may conclude that drainage is then and there required.

Similarly, if we find such lime-loving plants as dogweed, maple, spindle, wild cherry, chicory, burnet, and kidney vetch flourishing, we may be sure that lime or chalk is present in ample and available quantity, although our eyes may not be able to detect any signs of its presence upon the surface of the soil. On the other hand, there are certain plants intolerent of lime, or lime-haters, and the presence of these—sweet vernal grass, sweet chestnut, parsley fern, and bog and peat mosses—indicates that lime is deficient and should be applied for cultivated crops.

Seaside pines and sweet chestnut grow luxuriantly in soils poor in chalk, but are stunted and soon die, branch by branch, on chalk. Sheep, sorrel, bilberry, whortlebury, cranberry, and foxglove are also indications that the soil is poor in lime.

As a general rule, where nettles, primroses, clover, sow thistles, and goosefoot are found to flourish, it is a good sign for the agriculturist; but where crab grass, sorrel, horsetail, coltsfoot, may weed, and marsh rot abound there is something for the farmer to farm against. A blind farmer was once driven by his son to look at a derelict farm. Having arrived at their destination he told the lad to tie the pony up to the tallest thistle in the first field he came to. "There's plenty of docks and water-grass, father, but I can't see no thistles," said the boy; and this fact alone decided the blind parent against becoming a tenant of the land.

Mr. Bird gives a list of the plants more or less indicative of the nature of the soil upon which they thrive, and which may be safely taken as a guide to the general character of the soil.

The article is altogether of a very suggestive and interesting nature, and contains information which cannot fail to be of value to observant agriculturists.

A "SPARE TIME" ORCHARD.

WHAT A RAILWAY MAN HAS DONE.

As showing what may be accomplished by an energetic man, who, while engaged in other occupations, is determined to provide himself with a comfortable home for his declining years, no better example could be found than that of Mr. John Boyle, who is employed in the Railway Department permanent-way branch.

Some ten years ago Mr. Boyle entered the railway service, and was sent to work on the Great Southern railway, near Wagin. Later he was removed to Narrogin, and again to the Hotham River section. At this time little land had been selected, except near the established townships, and Mr. Boyle decided to take up a block on which he could erect a residence, and make a garden and orchard adjacent to his work. The department raised no objection to this project, fully recognising that a man holding property, which his energies and enterprise had improved, was likely to prove a valuable servant to the State, and not to be a shifter and grumbler with his lot. The block selected was adjacent to the ballast pit at the 208-mile post, and some three miles and a-half from Pingelly. The area first selected was 20 acres, which is now a freehold holding. Later, however, a homestead block was secured of about 158 acres, also a further C.P. lease of 92½ acres.

In the spare time the 20 acres were cleared and fenced, and a very neat and presentable dwelling erected, in which the family now reside. The homestead and C.P. lease are now also enclosed with a good boundary fence and partially cleared. The land adjacent to the home is planted in an orchard, principally of apples.

Some days ago a *Morning Herald* representative visited the home, and was greatly impressed with the whole aspect of the place. The orchard was inspected, and consists of about seven acres, on which are planted 650 trees, the trees being 24ft. apart and varying in age from four to five years. There is not the slightest sign of any disease, and even Mr. Compere's parasites would starve thereon. The varieties are Trevitt's Seedling, which are bearing heavy crops of large size and good quality; Jonathans look well and very clean; Rome Beauty are represented by 84 trees, all looking well, as do the splendid Cleopatras, which have made wonderful growth, and are bearing heavily. In the Pippins the Five Crown make a brave show, and are of good size, and particularly uniform. Pears are also represented by Wixten and Vicar of Wakefield, which, if anything, excel the apples. Plums are well represented by a number of Japanese varieties, including Burbanks, Hay's Seedling, and Wickson. This latter is a splendid variety, and does really well in this district, whilst the prunes do splendidly. Figs, apricots, and peaches all look in fine condition, and have borne excellent crops this year.

Grapes, too, are in good variety, there being about three-quarters of an acre in this crop, and they include that splendid carrying variety, the Almeria (or Darea). The bunches are large and the grapes much resemble the dainty Lady's Finger, but are much more succulent. Then there is a brave showing of Wortley Hall, Frontignac black variety, and the famed Gordo Blanco or Muscatel, which bear well, as they should do on the ideal grape-growing soil of the orchard. Little labour has been employed except that of the owner and his wife, who is an experienced orchardist. The children, whilst only young, also take a delight in their orchard and do considerable work. The trees and vines were all from local nurseries, and Mr. Boyle states over 95 per cent. grew, which is a good record.

There is no doubt that great credit is due to Mr. and Mrs. Boyle for the result of their labour, and it should serve as an example to hundreds of others. They have now a good home, and a splendid orchard to fall back on, which will give them a good return in the near future. All they now want, as Mrs. Boyle said, is a school handy, to which their children could be sent.

It would not be a scheme devoid of usefulness if the Commissioner of Railways devoted a few pounds per annum to prizes for such of his men who take up a side line such as this. These men are more likely to prove good servants to the State than those who take no interest therein or hold no property. Such men as Mr. Boyle, who took up land along the railways of the Argentine, helped to build up that State, and would do so here.

HOG CHOLERA.

If one's hogs are sick and the owner suspects that the disease may be cholera, the only safe thing is to make up one's mind that it is hog cholera in its worst form that he has to fight. If it happens to be some milder disease, he has erred on the right side, but he is not liable to err. In the second place, let him make up his mind that before his hogs will get it it has to be carried on to the farm just as bananas have to be carried into Dakota—that it will not start spontaneously on the farm. It is distinctively a germ disease. There are dozens of ways in which it may be brought into the herd. Birds, dogs, and stock may and do bring it; wagon-wheels will carry it, and one of the handiest ways to transmit it is to let somebody into the hog lot who has been in the pens where there were diseased hogs. Running streams are a fruitful source of infection; but there is little danger from that now on account of streams being frozen over. The germs may be transmitted in feed, or hogs may get them if allowed to run over ground where dead or diseased hogs have been dragged or driven. Cholera germs will live around the premises three to four months, and filth is a favourite haunt for them.

This indicates the course to pursue. Keep away from farms where there is or has been disease. Invite visitors to keep away from the hog-pens and do it gently but firmly. Tie up the dog and load the shotgun for stray ones, notifying all neighbours that the atmosphere around the place for some little time will be very bad for dogs. Shoot doves and other birds flying from place to place, and see to it that no strange stock is allowed to come around the premises. If you have hogs to sell, haul them to market rather than let the buyer come to your place to look them over; for the chances are that he has been called to farms where there is disase, to buy such hogs as have not been taken before they get it. All this will be a little strenuous, but remember that eternal vigilance is the price of hogs when disease is at large.

Clean all pens and feed-troughs, and do it thoroughly, and keep them clean, and be sure the water supply is pure. Disinfect the floors of the pens by sprinkling generously with lime, and disinfect the walls with a 5 per cent. solution of crude carbolic acid, and whitewash at least once each month. Some mix and incorporate the carbolic acid with the whitewash. Have the bedding dry and plentiful, and the hogs comfortable; and if they have been fed on exclusive corn diet, change it to more cooling feed. If possible, feed roots and skimmed milk, with bran and shorts. The healthier the hog, the greater the chances of resisting disease. All mudholes in the pens should be filled and kept filled, and the pens generally kept dry.

When it is possible, it is a good plan to divide up the hogs into three or four lots, and place them at safe distances apart, so that if one bunch becomes infected the rest may escape. This can be done generally when movable houses are used. But in case one lot should become diseased, the same person should not attend them as well as those yet free from contagion.

Should any become sick, remove the healthy one immediately to some other place. Should a hog die from any cause, burn the carcase—if possible, on the spot—so that contagion may not be scattered any more than absolutely necessary; and disinfect the ground and pen with corrosive sublimate dissolved in water in the proportion of 7½ grains to a pint of water.—*Dakota Farmer.*

GOVERNMENT LABOUR BUREAU.

REPORT FOR MARCH.

The Superintendent of the Government Labour Bureau reports as follows for the month of March:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 790. Of this number 544 were new registrations and 246 renewals, *i.e.,* men who called who were registered during the months of January and February. The trades or occupations of the 790 applicants were as follows:—Labourers, 293; handymen, 91; handy lads, 59; farm hands, 50; carpenters, 35; cooks, 30; miners, 17; gardeners, 16; engine-drivers, 14; firemen, 14; blacksmiths, 12; drivers, 11; kitchenmen, 9; painters, 9; yardmen, 8; hotel hands, 7; bushmen, 7; bricklayers, fitters, and printers, 6 of each; bakers, farm lads, and grooms, 5 of each; dairymen, 4; hairdressers, 4; butchers, clerks, groom-gardeners, plumbers, station hands, sailors, teamsters, and waiters, 3 of each; and 43 miscellaneous.

Engagements.—The engagements for the month totalled 325. The classification of work found was as follows:—Labourers, 118; bushmen, 56; farm hands, 33; navvies, 19; carpenters, 12; handymen, 11; farm lads, 9; handy lads, 9; cooks, 7; seamen, 7; hotel hands, shepherds, and yardmen, 4 of each; station hands, 3; stonemasons, 3; and 26 miscellaneous.

Kalgoorlie.

Registrations.—The new registrations numbered 32, and the renewals 24, classified as follows:—Handymen, 29; labourers, 15; clerks, miners, bricklayers, grocers, carpenters, barmen, bakers, engine-drivers, cooks, waiters, fitters, and firemen, 1 of each.

Engagements.—The engagements were 5, viz:—Handymen, 3; labourers, 1; clerks, 1.

The female servants who called numbered 31. The classification was as follows:—Generals, 7; waitresses, 7; cooks, 6; housemaids, 3; laundresses, 3; charwomen, 2; light generals, 2; nurses, 1.

There were no engagements.

Northam.

Registrations.—During the month there were 33 applicants for employment, classified as follows:—Farm hands, 12; labourers, 10; handymen, 4; clerks, 2; electricians, teamsters, handy lads, engine-drivers, and carter, 1 of each.

Engagements.—There were 29 engagements. The classification of work found was as follows:—Clearers, 9; chaffcutter hands, 8; farm hands, 5; labourers, 2; contractors, 2; handy lads, engine-drivers, and carter, 1 of each.

Women's Branch, Perth.

Registrations.—The new registrations for the month were 89, and the renewals 53. The classification was as follows:—Housemaids, 29; laundress-charwomen, 29; generals, 27; cooks, 17; housekeepers, 10; useful girls, 8; nurse-needlewomen, 5; light generals, 4; waitresses, 3; lady-helps, 3; pantrymaids, 2; married couples, 2; and 3 miscellaneous.

Engagements.—The engagements numbered 81, classified as follows:—Laundress-charwomen, 38; generals, 1; light generals, 8; working housekeepers, 6; cooks, 5; useful girls, 4; housemaids, 2; lady-helps, 2; and 6 miscellaneous.

General Remarks.

The number of men who called at the central office, Perth, during the month in search of work was 790. This total is 35 short of the number for February, and also 108 for that of the month of March last year. The engagements totalled 325, being 36 in excess of the previous month and 29 short of that of the month of March last year. At the present time vacancies exist for farm hands and men to clear land; there is some difficulty in filling such vacancies. The total number of registrations at the central office, Perth, for the quarter ending March 31, 1907, was 1,998, against 2,000 for the corresponding quarter of last year. The engagements for the same period were 906, against 732. Of the engagements 685 were from work supplied by private persons, against 690 for the corresponding quarter of last year. The engagements by Government Departments totalled 221, against 42 for the quarter ending March 31, 1906.

At the women's branch, Perth, the women who applied for work during the quarter totalled 353, against 413 for the same period of last year. The engagements were 237, as against 241.

APRIL REPORT.

The following is the report of the Superintendent of the Government Labour Bureau on the work of the Bureau for the month of April:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 727. Of this number 415 were new registrations, and 312 renewals, *i.e.*, men who called who had been registered during the year prior to the month of April. The trades or occupations of the 727 applicants were as follows:—Labourers 190, handy men 83, farm hands 66, handy lads 56, bushmen 46, carpenters 23, cooks 23, horse-drivers 17, yardmen 13, engine-drivers, gardeners, grooms, and painters 11 of each, blacksmiths 10, firemen 9, bricklayers 8, station hands 8, fitters 7, hotel hands 7, butchers, kitchenmen, miners, and orchardists 6 of each, clerks, dairymen, plasterers, and sailors 5 of each, caretakers, orderlies, sawmill hands, strikers, and teamsters 4 of each, bakers, engineers, painters, and stonemasons 3 of each, and 41 miscellaneous.

Engagements.—The engagements for the month totalled 239. The classification was as follows:—Bushmen 37, labourers 37, handy men 31, farm hands 30, farm lads 17, handy lads 12, quarrymen 8, carpenters (rough), carpenters, kitchenmen, and station hands 5 of each, cooks, gardeners, and married couples 4 of each, bricklayers, fencers, and teamsters 3 of each, and 26 miscellaneous.

Kalgoorlie.

Registrations.—The applicants for work numbered 56. There were 34 new registrations and 22 renewals. The classification was as follows:—Labourers 17, handy men 14, handy youths 6, blacksmiths, grooms, barmen, grocers, and fitters 2 of each, bricklayers, firemen, plumbers, woodcutters, clerks, strikers, cooks, carpenters, and hairdressers 1 of each.

Engagements.—There were 6 engagements, viz., miners 2, grooms, hairdressers, labourers, and yardmen 1 of each.

The female servants who called numbered 24. The new registrations were 13, and the renewals 11. The classification was as follows:—Cooks 4, waitresses 4, charwomen, generals, and light generals 3 of each, housekeepers 2, housemaids 2, laundresses, barmaids, and nurses 1 of each. There were no engagements.

Northam.

Returns not yet to hand.

Women's Branch, Perth.

Registrations.—The new registrations for the month were 118, and the renewals 67. The classification was as follows:—Housemaids 43, generals

29, cooks 25, laundress-charwomen 25, housekeepers 21, waitresses 9, light generals 6, useful girls 6, nurses 5, married couples 5, lady-helps 3, and 8 miscellaneous.

Engagements.—There were 73 engagements, classified as follows:—Laundress-charwomen 31, generals 19, cooks 7, light generals 5, cook-laundresses, useful girls, and nurse-needlewomen 3 of each, and housemaids 2.

General Remarks.

The number of individual men who called at the central office, Perth, during the month was 727. This is 63 short of the number for March, and 62 in excess of that for the month of April last year. The engagements were 239. There were 231 by private persons, this being 4 in excess of the number for March, and 42 in excess of that for the month of April last year; there were 8 engagements by Government-departments. The engagements for the country districts totalled 152, and the town 87.

During the month there were 65 men assisted by railway passes to employment from the central office, Perth. The fares refunded totalled £33 2s. 1d., and the sum of £9 2s. 8d. was received from employers to send men, also £5 18s. 8d. to send women. In a number of instances where men ignored to fulfil their agreements to refund fares, the collection of same was placed in the hands of the police, who have been successful in obtaining several amounts.

At the women's branch, Perth, 185 women called during the month. As compared with the previous month the number is 43 more, and 39 more than that for April last year. The engagements were 73, being 8 short of the number for March, and 9 short of that for April last year.

GARDEN NOTES FOR JUNE.

By G. Chitty Baker.

It can safely be said that by the time these notes are in print the wet season will be well established. One of the first lessons to be learnt at this time is to find out where it will be most advantageous to make drains to carry off the surplus water. Drainage is as important as cultivation where the ground has been well worked. Operations can be continued right through this month, providing we have not too much wet.

In using chemical fertilisers during the rainy season it should always be borne in mind that such manures as sulphate of ammonia and sulphate of potash are very soluble, and should not be applied to any but growing crops, otherwise they may be washed away and no benefit derived from them.

Beans, Broad.—These should be now well advanced. A further supply should be sown once a fortnight. Keep the rows well apart and running north and south; sow nine inches apart in rows five to six feet apart, using the intermediate space for quick-growing saladings.

Cabbage, Cauliflower, Brussells Sprouts, and Silver Beet.—Keep growing plants free from weeds and the ground well stirred. Plant out any young plants coming on.

Carrots.—Continue to sow.

Celery.—Young plants may be picked out and a little more seed sown in favourable positions.

Leek and Onions.—Young plants may be set out and more seed sown.

Lettuce.—Continue sowing, cultivate growing plants.

Peas.—The second early or main crop varieties may be sown now. Stick all kinds that grow over 18 inches high.

Turnips.—Thin out growing crops, sow a little more seed for succession.

Potatoes.—Make boxes and set tubers to sprout for July planting.

FARM NOTES FOR JUNE.

By Percy G. Wicken.

The latter end of May and the early part of June are busy weeks on the farm, as under the conditions of our climate it is during this period that a very large proportion of the wheat crop has to be sown. Those who have areas of fallow land will be able to get their crops sown earlier than this, and, as is demonstrated every year, will get the best results through being in a position to get their crops sown early. But this is a comparatively new country for agriculture, and the bulk of the settlers have not been sufficiently long on the land to have the necessary area of land cleared to enable them to fallow a third of their cultivation area each year. When a man has only a few acres cleared he has to crop it every year to enable him to live while he is clearing a further area; and it is in a season like the present, when the rain comes late, that it is a great effort for him to get his land ploughed and sown before it gets too late in the season. Each year more land is being ploughed during the summer months than has been done previously, and by the use of the modern disc ploughs, land that could not be broken up by the ordinary plough can be satisfactorily worked up and got ready for sowing.

In this case the seed can be sown previous to the rain, and the settler is then able to get on faster with ploughing and sowing his new land.

Whatever the conditions of the settler may be, if he wishes to get the best returns from his crops he must endeavour to get them sown during April, May, or June, and not later than the middle of June. If it is not possible to get the sowing done by this date the earliest varieties of wheat should be sown last; as these occupy the ground for a shorter time than the slow-growing ones they have a better chance of coming to maturity, while the slow-growing wheats, which take longer to come to maturity, should be sown as early as possible.

Very little has been done in this State with regard to spring sown wheats, but I think that in our more southern districts spring varieties of wheat such as Allora Spring and Early Para would, if sown in August, give a good account of themselves. They would require to be sown on well-drained land, or otherwise in this district there would be a difficulty in getting the teams with the drill over the ground. Experiments with these and other varieties of early wheats sown in the spring in the Southern districts would be worth trying.

Each year causes more interest to be taken in the cultivation of grasses, and this year, owing to the low price obtained for wheat and the necessity of farmers turning their attention to some other means of making ends meet, the inquiries have been greater than ever. The prominence which has lately been given to the subject of raising early lambs for export purposes has been the means of causing people to make inquiries as to what to feed them on. While it is possible to grow crops of rape, barley, peas, root crops, and so on for the purpose of topping up these sheep, the pasture land of the farm must still continue to support the bulk of the store and stud animals, and to enable these to keep in the best condition every effort should be made to improve these pastures. This may be done by first trying to improve the natural pastures which will readily respond to the application of fertilisers and a few strokes of a heavy harrow; secondly, by ploughing or even scarifying the grazing paddocks and planting seeds or roots of such grasses as it has been proved by previous experiments on a smaller scale are most suitable for the district.

We hear of many instances of the failure of grass seeds to germinate, but this is due in many cases to the lack of cultivation given to the ground. Grass seeds are very small, and require to be sown on land which has been brought to a fine tilth, and not, as is frequently the case, on rough, soddy land only roughly turned over by the plough. In fact, I think that if the surface were only just harrowed and the seed sown on the harrowed surface the seed would have a better chance than on some of the roughly ploughed land I have seen the seed sown on.

The cost of laying down a permanent pasture is a serious item, the seed alone costing from 20s. to 40s. per acre, according to the variety; and if it is worth going to the expense of purchasing this seed it should be worth the extra trouble of putting it in under conditions most favourable to its growth.

As a general rule, grass seeds should, under our climatic conditions, be sown about the same time as wheat, if not somewhat earlier. In the Eastern districts the best results will be obtained by having all grass seeds sown before the first rains; the seeds would then get softened by the first rains, and would come up under the same conditions as the seeds of the native grasses which have remained in the soil since the previous season. Those remarks, especially in the Eastern districts, would apply also to the summer grasses such as Paspalum dilatatum and Rhodes grass, which, if sown in the spring, do not germinate and obtain a root hold of the ground before the weather becomes hot and dries up the young tender shoots. If these grasses can be made to germinate before the ground becomes cold in the winter, they will then obtain sufficient root hold to enable them to resist the dry weather before the summer becomes hot. Farther south, where the winter is longer and colder, it may be more advantageous to sow these grasses in the spring, but this has not yet been sufficiently demonstrated to enable a definite statement to be made.

To obtain the best results from grasses in this climate, only the deep-rooted varieties should be sown, and our experience so far indicates that Paspalum dilatatum, Rhodes grass, Eragrostis pilosa, African wonder grass, Cooksfoot, Wallaby, and Tall Fescue are about the best grasses; while Sheep's Burnett is a valuable and quick-growing fodder plant, suitable to be sown mixed with any of the grass seeds.

Fodder plants to supplement the grass paddocks are receiving more attention each season. Foremost amongst these is the rape plant. Some few years ago there was hardly a plant of rape grown in the State; now a very large proportion of the farmers of the State have a larger or smaller area of rape planted, and realise its great value as a fodder plant. Tons of rape seed are being imported into the State annually, and as it only takes a few pounds to sow an acre, the area under rape should be considerable. Rape seed should be planted in fallow land as early as possible in the season, the object being to get the plant up sufficiently so that the sheep can be turned on it immediately after lambing. To obtain the best results the paddock should be divided up and the sheep only allowed to feed on a part of it at a time; as soon as one part is fed off they can be removed to the next part, and the area fed off, if not eaten down too low, will soon shoot up again.

Field peas, for use either as green feed or allowed to ripen and used as grain, are worth much more attention from the farmer than they receive. Barley and peas or tares sown early in the season, or even at the present time, will soon provide a succulent feed of high feeding value, and one very suitable for dairy cattle, and readily eaten by all kinds of stock, the peas supplying the legumes to the fodder which are required in all properly balanced rations. If the quantity is more than sufficient to meet requirements it can be turned into ensilage, or even to hay, in both of which forms it makes an excellent fodder. If the peas are grown by themselves and allowed to become ripe they form one of the best foods for sheep and pigs; in fact "pea-fed pork" is often stipulated for in contracts in the U.S.A., where the best quality is required. It is a somewhat difficult matter to thrash the peas, but if they are only required for feeding sheep or pigs it is not necessary to thrash them at all. If the haulms are stacked by the side of the sheep or pig yard, a quantity can be thrown over the fence every day and the animals will thrash them out for themselves.

Lucerne is another leguminous crop of high feeding value which is being tried in this State, but only in a few instances is sufficient care given to the preparation of the ground to enable satisfactory results to be obtained. Lucerne requires a well-drained and deep soil, and the surface must be brought to a fine tilth and be free from weeds before the seed is sown; the young plant is of a delicate nature, and wants protecting against weeds in its early stage of growth. The seed should be sown with the first rains in the Eastern districts, and must be kept free from weeds until the plants are sufficiently grown to be fit for cutting. Lucerne does not give its best results when fed down; the plant should be cut with the mowing machine as soon as it comes out into flower, the green lucerne either fed to stock or made into hay. Lucerne can, under favourable circumstances, be cut from six to eight times during the summer, and will no doubt become one of our most valuable fodder crops. Many of our settlers are planting out areas of lucerne, and we shall no doubt soon have some definite results to go on.

Oats are a crop that should receive considerable attention from the farmer this season. Oats can be grown successfully in most parts of the State, and so far very little attention has been paid to their cultivation. During 1906 there were 15,713 acres under oats in this State, and the average yield was 18.07 bushels per acre; while the imports of oats into the State amount to about 20,000 bushels per month. At the present time oats are commanding about the same price as wheat, and with an average yield of 18.07 bushels per acre against 11.8 bushels per acre for wheat, oats should prove the most profitable of the two crops to cultivate. Oats should be sown about the same time as wheat, or even a little later, and require to be treated in the same manner. More seed is required than in the case of wheat, from two to two and a half bushels per acre being required. The seed should be steeped in a solution of bluestone and water (1lb. to 5 gallons) before sowing as a preventative against smut. The "brown oats" which used to be grown in the Northam district some years ago was an excellent variety and a good yielder, but seed of that variety is now hard to obtain.

At the end of the sowing season care should be taken to thoroughly clean out all the fertiliser from the seed drill and oil it thoroughly before it is put away; the fertiliser, if left in the drill, soon eats into the fittings and does more harm to the drill than does the actual work of sowing the crop.

NOTES ON THE CLIMATE FOR THE MONTH OF APRIL, 1907.

The weather has been mostly fine throughout the State with high atmospheric pressure, the reading of barometers throughout the South-West on the morning of the 14th being the highest on record for April.

Day temperatures have been generally from 1deg. to 2deg. above normal, but several cold nights have been experienced inland.

The following table gives the mean and lowest temperature registered by a thermometer placed on the surface of the ground:—

Station.	Mean.	Lowest	Date.	Station.	Mean.	Lowest	Date.
Peak Hill ..	59·0	49·0	16	Wandering	40·7	28·3	17
Cue	55·1	40·5	28	Bridgetown	38·2	26·0	18
Coolgardie ...	47·4	39·0	16	Karridale	45·2	34·0	16
Southern Cross ...	46·0	35·0	15	Katanning ...	42·9	31·2	21
Walebing ...	46·4	34·2	16	Mt. Barker	40·6	35·0	10, 12, 13, 19, 21
Perth Observatory	52·4	38·7	19				

The rainfall has been below the average for previous years throughout the State. None fell in the Tropics, with the exception of a few light showers in the East Kimberley District, and very little over the Goldfields.

In the South-West from half to one inch was recorded, chiefly on the 26th and 27th, in connection with the severe storm which visited the South coast. This was the first winter storm of the season, and marked the breaking up of the summer. The barometer commenced to fall at Cape Leeuwin on the 25th, and reached its minimum 29.45 at midnight on the 26th, and at Breaksea, 29.419, at 2 a.m. on the 27th. The velocity of the wind at Cape Leeuwin averaged 46 miles per hour during the 24 hours ending at 8 a.m. on the 27th, and very rough seas were experienced. By the morning of the 28th the disturbance had reached the border of South Australia and the weather commenced to moderate along the South coast.

W. E. COOKE,
Government Astronomer.

The Observatory,
Perth, 8th May, 1907.

The Climate of Western Australia during April, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						April, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
North-West and North Coast:	Wyndham	29·886	29·902	30·028	29·785	95·6	77·0	86·3	99·8	71·8	95·0	77·2	103·2	63·5	38	2	1,871
	Derby	29·920	29·912	30·056	29·823	95·2	69·2	82·2	100·2	63·0	95·3	71·0	104·5	54·5	Nil	...	2,167
	Broome	29·912	29·919	30·081	29·806	94·2	70·8	82·5	99·0	62·8	93·4	72·0	102·4	56·0	Nil	...	2,077
	Condon	29·944	29·942	30·082	29·825	92·9	64·9	78·9	97·9	59·8	90·7	66·9	102·0	46·0	Nil	...	1,774
	Cossack	29·950	29·948	30·090	29·810	94·0	68·0	81·0	103·0	63·0	91·9	70·5	105·7	57·6	Nil	...	1,899
	Onslow	29·974	29·949	30·128	29·850	94·0	66·4	80·2	105·0	58·2	92·2	67·5	105·9	53·0	Nil	...	550
	Winning Pool ...	29·966	...	30·115	29·839	96·2	65·2	80·7	103·0	55·8	...	...	...	...	Nil	...	878
	Carnarvon	...	29·998	...	...	86·2	67·6	76·9	98·0	59·0	83·5	64·2	103·1	52·2	Nil	...	219
	Hamelin Pool... ...	29·014	30·004	30·172	29·884	88·5	62·5	75·5	95·4	53·8	86·1	61·6	105·6	47·6	7	2	70
	Geraldton	29·087	30·056	30·320	29·896	82·0	59·3	70·6	94·0	50·2	78·6	59·2	102·3	41·8	44	5	137
Inland:	Hall's Creek	29·962	29·964	30·093	29·854	92·4	60·7	76·6	97·2	49·4	90·5	63·1	102·0	47·0	Nil	...	1,541
	Marble Bar	...	...	...	...	97·7	67·9	82·8	105·5	61·0	96·8	69·8	107·0	50·0	Nil	...	804
	Nullagine	29·980	29·960	30·170	29·800	93·2	62·3	77·8	101·0	52·0	97·0	62·3	101·5	41·0	Nil	...	579
	Peak Hill	30·020	29·988	30·266	29·827	88·0	63·1	75·5	99·6	55·0	84·3	61·6	99·2	47·4	Nil	...	448
	Wiluna	30·060	29·992	30·324	29·778	85·0	56·2	70·1	100·0	47·0	84·8	56·7	99·4	39·5	Nil	...	361
	Cue	30·064	30·032	30·336	29·858	86·7	59·5	73·1	101·2	51·8	85·1	60·2	101·8	41·0	21	2	439
	Murgoo	...	...	...	...	86·8	60·9	73·8	100·0	49·5	...	...	...	...	5	1	310
	Yalgoo	30·064	30·034	30·296	29·851	83·6	57·6	70·6	98·1	47·1	84·2	58·1	102·5	42·3	Nil	...	309
	Nunngarra	...	...	...	...	80·9	56·8	68·8	97·0	45·0	...	...	...	...	6	1	365
	Lawlers	30·076	30·049	30·416	29·821	82·5	56·6	69·6	100·4	46·8	82·1	58·7	101·4	39·4	Nil	...	372
	Laverton	30·112	30·070	30·484	29·763	80·8	55·6	68·2	100·7	47·0	82·7	57·2	100·8	38·6	Nil	...	569
	Menzies	30·085	30·073	30·447	29·778	7·87	54·8	66·8	99·0	44·0	79·5	56·4	101·5	37·0	Nil	...	216
	Kanowna	...	...	...	...	76·1	51·6	63·8	97·0	44·0	...	...	...	...	2	2	476
	Kalgoorlie	30·142	30·094	30·541	29·737	76·8	53·5	65·2	98·1	45·0	78·4	55·2	101·4	38·8	6	1	480
	Coolgardie	30·150	30·090	30·567	29·762	75·3	54·0	64·6	96·2	45·0	77·9	54·1	101·1	38·1	Nil	...	638
	Southern Cross ...	30·155	30·070	30·530	29·780	79·0	50·0	64·5	95·0	41·0	79·6	51·7	101·1	31·7	16	2	262
	Kellerberrin	...	...	...	...	...	...	...	...	...	...	...	...	...	38	3	203
	Walebing	...	...	...	...	80·2	52·3	66·2	97·8	40·4	78·9	52·5	95·7	37·4	41	4	274
	Northam	...	...	...	...	80·3	51·9	66·1	97·5	41·0	79·2	51·6	92·6	37·4	21	3	234
	York	30·136	30·100	30·526	29·765	79·5	51·4	65·4	95·0	41·0	78·7	51·3	101·8	34·5	64	3	183
	Guildford	...	...	...	...	81·5	53·9	67·8	99·0	41·0	79·1	53·7	96·4	36·5	159	3	246

The Climate of Western Australia during April, 1907—*continued.*

Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
					April, 1907.					Average for previous Years.						
	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
South-West and South Coast:																
Perth Gardens	30·128	30·104	30·514	29·733	78·7	56 8	67·8	93·8	47·2	77·1	55·0	99·0	41·0	96	3	199
Perth Observatory ...	30·140	30·095	30·526	29·710	78·0	56·7	67·4	96·8	47·5	75·8	56·6	98·0	42·4	111	3	212
Fremantle	30·153	30·095	30 522	29·798	76·5	58·5	67·5	92·0	50·0	73·9	58·9	93·6	46·4	53	6	159
Rottnest	30·149	30·080	30·528	29·790	74·3	60·8	67·6	83·2	52·0	72·6	60·8	92·0	47·8	54	5	147
Mandurah	...	...	...	...	77·4	52·3	64·8	89·1	39·7	75·6	52·4	93·4	36·8	93	5	148
Marradong	...	...	...	...	..	...	...	. .	...	...	...	...	...	71	2	196
Wandering	...	...	...	...	75·7	46·6	61·2	90·4	33·7	74·3	45·9	90·4	32·1	44	3	255
Narrogin	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..
Collie	...	...	...	...	76·0	45·0	60·5	88·5	32·8	73·4	44·7	89·1	29·6	88	2	222
Donnybrook	...	...	...	...	76·0	48·7	62·4	89·3	37·0	74·0	49·1	86·7	33·4	83	3	318
Bunbury	30·162	30·104	30·577	29·701	75·8	52·3	64·0	84·3	42·9	73·4	53·3	89·5	36·7	63	3	210
Busselton	...	...	...	...	73·4	48·2	60·8	81·0	36·8	72·2	50·0	87·3	32·2	43	4	184
Cape Naturaliste ...	30·145	...	30·560	29·650	70·0	54·9	62·4	76·8	48·0	...	...	...	...	79	5	318
Bridgetown	...	...	...	...	75·9	44·2	60·0	86·9	32·0	73·3	45·1	90·0	29·5	57	4	287
Karridale	30·150	30·058	30·560	29·540	73·0	51·0	62 0	82·0	40·0	71·2	51·8	92·0	36·6	75	6	382
Cape Leeuwin	30·145	30·077	30 570	29 450	70·0	59·0	64·5	76·0	52·0	69·5	59·1	89·5	49·0	85	8	415
Katanning	30·182	30·094	30·617	29·643	73·4	48·2	60·8	88·0	39·0	73·0	49·1	96·2	33·0	41	2	260
Mt. Barker	...	...	...	...	71·2	48·1	59·6	79·0	40·0	...	...	...	...	55	6	453
Albany	30·177	30·098	30·609	29·530	70·0	54·1	62 0	81·6	46·5	69·3	52·8	98·8	39·5	101	7	423
Breaksea...	30·175	30·100	30·660	29·420	66·0	56·0	61·0	75·0	51·0	66·7	56·2	96·4	44·0	119	14	489
Esperance	30·209	30·121	30·630	29·657	69·0	53·0	61·0	85·0	41·5	72·7	54·5	99·0	39·5	68	5	350
Balladonia	30·182	30·115	30·554	29·631	73·7	47·9	60·8	86·0	41·9	76·6	51·9	103·4	37·5	16	3	455
Eyre	30·124	30·120	30·476	29·574	73·3	53·2	63·2	94·6	36·8	74·6	54·8	104·9	36·8	4	2	409
INTERSTATE.																
Perth	30·140	30·095	30·526	29·710	78·0	56·7	67·4	96·8	47·5	75·8	56·6	98·0	42·4	111	3	212
Adelaide	30·080	30·146	30·340	29·690	69·8	52·5	61·2	92·0	45·0	73·4	54·7	98·0	39·6	226	16	501
Melbourne	29·996	30·025	30·361	29·637	65·8	50·6	58·2	90·0	43·0	68·6	50·6	94·0	34·8	238	14	582
Sydney	30·040	30·103	30·440	29·570	72·0	57·0	61·5	82·0	49·0	70·8	58·2	88·9	44·6	150	6	1,517

The Observatory, Perth, 8th May, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for March, 1907 (completed as far as possible), and for April, 1907 (principally from Telegraphic Reports).

STATIONS.	MARCH, 1907.		APRIL, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham ...	464	7	38	2
6-Mile	...	...	...	...
Carlton	629	8	...	...
Ivanhoe	442	9	...	...
Argyle Downs ...	527	7	...	...
Rosewood Downs	...	...	...	...
Lisadell	..	...	...	...
Turkey Creek ...	233	7	23	2
Ord River ...	...	...	...	...
Alice Downs ...	...	...	...	...
Flora Valley ...	...	...	...	...
Hall's Creek ...	277	5	Nil	...
Nicholson Plains	.	...	...	...
Ruby Plains ...	...	...	...	...
Denison Downs	...	...	...	..
WEST KIMBERLEY:				
Mt. Barnett ...	...	...	...	...
Mt. House ...	...	...	...	...
Leopold Downs...	...	...	...	...
Fitzroy Crossing (P.O.)	864	11	Nil	...
Fitzroy Station ..	...	...	...	...
Brooking ...	...	...	...	...
Cherrabun ...	..	. .	...	...
Bohemia Downs	...	..	...	...
Quanbun ...	...	...	..	...
Nookanbah ...	...	...	..	...
Upper Liveringa	352	10	...	...
Yeeda	...	...	...	...
Derby	875	16	Nil	..
Pt. Torment ...	858	15	...	...
Obagama ...	924	16	...	...
Beagle Bay ...	1450	13	...	...
Roebuck Downs	542	12	...	...
Kimberley Downs	...	...	...	...
Broome	396	9	Nil	...
Thangoo ...	...	...	...	...
La Grange Bay...	791	8	Ni	...
N.W. COAST:				
Wallal	537	11	Nil	...
Pardoo	815	9	...	...
Condon	291	8	Nil	...
DeGrey River ...	434	10	...	...
Port Hedland ...	607	8	Nil	...
Boodarie ...	637	7	...	...
N.W. COAST—*contd.*				
Balla Balla ...	...	...	...	...
Whim Creek ...	1022	9		...
Mallina	...	...	...	...
Croydon	763	8	...	...
Sherlock... ...	...	...	...	...
Woodbrooke ...	1134	9	...	...
Cooyapooya ...	1074	9	...	...
Roebourne ...	1019	7	2	1
Cossack	1498	8	Nil	...
Fortescue ...	1030	6	Nil	...
Mardie	673	7	...	...
Chinginarra ...	824	6	...	...
Yarraloola ..	340	6	...	...
Peedamullah ...	526	6	...	...
Onslow	504	8	Nil	...
Point Cloates ...	...	...	...	...
N.W. INLAND:				
Ethel Creek ..	288	9	...	...
Warrawagine ...	417	6	...	...
Eel Creek ...	..	..	...	...
Muccan	...	...	...	...
Ettrick	453	9	...	...
Strelly	372	9	...	...
Mulgie	329	8	...	...
Warralong ...	...	...	...	...
Coongon ...	449	8	...	...
Talga	152	8	...	...
Bamboo Creek ...	520	11	Nil	...
Moolyella ...	...	...	...	...
Marble Bar ...	350	9	Nil	...
Warrawoona ...	595	8	Nil	...
Corunna Downs	298	8	...	...
Mt. Edgar ...	...	...	...	...
Nullagine ...	392	7	Nil	...
Middle Creek ...	495	8	...	...
Mosquito Creek	...	...	...	...
Roy Hill ...	320	8	...	...
Bamboo Springs	368	7	...	...
Kerdiadary ...	540	7	...	...
Woodstock ...	...	...	...	...
Yandyarra ...	672	6	...	...
Station Peak ...	837	8	...	...
Mulga Downs ...	503	9	...	...
Mt. Florence ...	951	7	...	...
Tambrey ...	679	9	...	...
Millstream ...	580	4	...	...

RAINFALL—*continued.*

STATIONS.	MARCH, 1907.		APRIL, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. INLAND—*contd.*				
Red Hill ...	412	3	...	...
Mt. Stewart ...	...	...	...	...
Peake Station ...	..	...	...	...
Nanutarra ...	349	4	...	...
Yanrey	546	5	...	...
Wogoola ...	496	6	...	...
Towera	480	3	...	...
GASCOYNE:				
Winning Pool ...	415	3	Nil	...
Coordalia ...	500	...	...	...
Wandagee ...	...	...	...	...
Williambury ...	439	3	...	...
Yanyeareddy ..	512	8	...	...
Maroonah ...	315	3	...	...
Ullawarra ...	317	3	...	...
Mt. Mortimer ...	...	...	...	...
Edmunds ...	240	8	...	...
Gifford Creek ...	...	...	...	...
Bangemall ...	154	2	...	...
Mt. Augustus ...	...	...	...	...
Upper Clifton Downs	293	3	...	...
Clifton Downs ...	511	5	...	...
Mearerbundie ...	...	...	...	...
Byro	238	4	...	...
Meedo	165	4	...	...
Minnie Creek ...	360	3	...	...
Bintholya ..	...	...	...	...
Lyon's River ..	691	3	...	...
Mangaroon ...	397	4	...	...
Booloogooroo ...	585	5	...	...
Doorawarrah ...	...	...	...	...
Brick House ..	252	4	...	...
Boolathana ...	351	5	...	...
Carnarvon ...	211	5	Nil	...
Point Charles ...	297	6	...	...
Dirk Hartog ...	...	...	...	...
Sharks Bay ...	48	1	13	2
Wooramel ...	116	8	22	2
Hamelin Pool ...	85	1	7	2
Kararang ...	64	1	...	...
Tamala	95	2	...	...
YALGOO DISTRICT:				
Woolgorong ...	135	8	...	...
New Forest ...	156	8	...	...
Yuin	150	1	...	...
YALGOO DISTRICT—*contd.*				
Pindathuna ...	135	2	...	...
Tallyrang ...	...	...	...	...
Mullewa ...	87	2	22	8
Kockatea ...	90	2	...	...
Barnong ...	238	8	16	2
Gullewa	134	8	...	...
Gullewa House...	235	4	20	8
Gabyon	271	3	...	...
Mellenbye ...	134	7	19	8
Wearagaminda...	192	8	...	...
Yalgoo	224	4	Nil	...
Wagga Wagga ...	231	5	5	1
Muralgarra ...	158	8	...	...
Burnerbinmah ...	167	3	...	...
Nalbara	...	...	...	...
Wydgee	212	5	19	2
Field's Find ...	209	5	28	8
Thundelarra ...	237	3	74	2
Rothesay ...	...	...	...	...
Ninghan ...	201	2	...	...
Condingnow ...	270	6	30	2
163-Mile ...	266	4	Nil	...
Palaga Rocks ...	...	...	...	...
126-Mile ...	220	3	28	8
90-Mile	318	6	...	...
Mt. Jackson ...	282	5	...	...
MURCHISON:				
Wale	97	2	...	...
Yallalonga ...	...	...	...	...
Billabalong ...	91	3	...	...
Twin Peaks ...	172	5	...	...
Murgoo	186	5	5	1
Mt. Wittenoom ..	93	8	...	...
Meka	150	4	...	...
Wooleane ...	179	5	...	...
Boolardy ...	198	5	...	...
Yederah ...	395	8	...	...
Woogorong ...	187	8	...	...
Manfred ...	361	5	...	...
Yarra Yarra ...	...	...	...	...
Milly Milly ...	237	4	...	...
Berringarra ...	379	8	...	...
Miloura	393	3	...	...
Mt. Gould ...	...	...	...	..
Moorarie ...	206	1	...	...
Peak Hill ...	385	7	Nil	...
Minderoo ...	...	...	...	...
Abbotts	327	4	Nil	...
Belele	402	4	...	...

RAINFALL—*continued.*

Stations.	March, 1907.		April, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
MURCHISON—*contd.*				
Gabanintha ...	277	6	Nil	...
Bungalow ...	207	4	Nil	...
Quinns	275	2	...	...
Nannine	318	5	3	1
Annean	448	4	Nil	...
Tuckanarra ...	398	4	12	1
Coodardy ...	250	2	42	1
Cue	201	8	21	2
Day Dawn ...	197	2	20	1
Lake Austin ...	297	3	4	1
Lennonville ...	428	7	Nil	...
Mt. Magnet ...	276	4	10	1
Youeragabbie ...	370	2	...	...
Murrum	210	8	...	...
Challa	355	4	13	2
Nunngarra ...	321	5	6	1
Berrigrin ...	434	7	...	...
EAST MURCHISON:				
Gum Creek ...	400	9	...	..
Dural	221	7	...	...
Wiluna	274	7	Nil	...
Mt. Sir Samuel ...	224	6	Nil	...
Leinster ...	...	...	...	...
Lawlers	252	4	Nil	...
Wilson's Patch ...	232	6	...	...
Lake Darlôt ...	Nil	...	332	...
Darda	...	. .	...	.
Salt Soak ...	263	6	...	..
Duketon ...	346	7	...	...
Erlistoun ...	197	7	.	...
NORTH COOLGARDIE GOLDFIELDS:				
Laverton ...	454	9	Nil	...
Mt. Morgans ...	441	6	Nil	...
Murrin Murrin ...	661	8	12	1
Mt. Malcolm ...	233	8	3	1
Mt. Leonora ...	356	5	2	1
Tampa	401	8	Nil	...
Kookynie ...	450	8	Nil	...
Niagara	386	7	Nil	...
Yerilla	450	7	...	...
Yundamindera ..	523	7	Nil	...
Mt. Celia ...	...	...	...	...
Edjudina ...	204	5	5	1
Quandinnie ...	320	5	...	...
Menzies	169	7	Nil	...
Mulline	482	6	12	1
Mulwarrie ...	398	7	22	1
Goongarrie ...	305	7	Nil	...

Stations.	March, 1907.		April, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
COOLGARDIE GOLDFIELDS:				
Waverley ...	240	4	25	1
Bardoc	421	5	13	1
Broad Arrow ...	227	8	Nil	...
Kanowna ...	393	9	2	2
Kurnalpi ...	455	7	Nil	...
Bulong	357	8	Nil	...
Kalgoorlie ...	357	8	6	1
Coolgardie ...	527	9	Nil	...
Burbanks ...	289	7	5	1
Bulla Bulling ...	311	6	19	1
Woolubar ...	458	6	...	...
Waterdale ...	617	8	33	1
Widgiemooltha ...	503	11	37	3
15-Mile Condenser	372	6	21	1
50-Mile	525	...	...	...
Norseman ...	319	13	20	2
Lake View ...	377	8	..	...
Frazer Range ...	430	11	...	...
Southern Hills ...	504	8	...	...
YILGARN GOLDFIELDS:				
129-Mile	97	7	...	...
Emu Rocks ...	165	4	...	...
56-Mile	164	4	...	...
Glenelg Rocks ...	135	9	...	...
Burracoppin ...	84	2	20	1
Bodallin ...	191	3	22	1
Parker's Road ...	...	...	...	...
Southern Cross ...	199	8	16	2
Parker's Range ...	232	8	...	...
Yellowdine ...	215	3	20	1
Karalee	322	6	20	2
Koorarawalyee ..	325	8	21	2
Boorabbin ...	366	8	10	1
Boondi	335	7	11	2
SOUTH-WEST (NORTHERN DIVISION):				
Murchison House	100	1	...	...
Mt. View ...	160	1	18	3
Mumby	149	4	85	4
Willow Gully ...	70	2	34	4
Northampton ...	119	3	49	3
Chapman Experimental Farm	65	1	26	1
Narratarra ...	35	2	...	...

RAINFALL—*continued.*

Stations.	March, 1907.		April, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
South-West (Northern Division)—*contd.*				
Oakabella ...	49	2	46	4
White Peak ...	41	2	.	...
Geraldton ...	93	5	44	5
Hinton Farm ...	..	...	...	...
Tibradden ...	...	..	...	...
Myaree	100	4	..	...
Sand Springs ...	92	1	...	...
Nangetty ...	109	3	46	4
Greenough ...	42	4	46	4
Bokara	56	6	30	4
Dongara ...	51	6	54	3
Strawberry ...	87	4	86	5
Yaragadee ...	103	3	51	5
Urella	112	4		...
Opawa	59	5	44	5
Manara	66	3	59	5
Mingenew ...	85	5	59	6
Yandenooka ...	24	1	41	2
Arrino	93	3	43	2
Three Springs ...	108	6	69	5
Carnamah ...	89	2	88	5
Jun Jun	132	4	69	3
Watheroo ...	102	4	31	3
Nergaminon ...	127	6	43	5
Dandaragan ...	76	6	58	4
Yatheroo ...	33	21	...	...
Moora	91	4	50	4
Walebing ...	109	7	41	4
Round Hill ...	99	5	25	4
New Norcia ...	44	4	39	4
Wongon Hills ...	131	6		...
Wannamel ...	78	6	50	3
Gingin	102	5	44	3
South-West (Metropolitan):				
Wanneroo ...	60	5	111	3
Belvoir	70	4	145	3
Wandu	52	6	157	3
Mundaring ...	106	6	131	3
Canning Waterworks	53	7	119	4
Kalbyamba ...	48	4	116	4
Guildford ...	26	8	159	3
Perth Gardens ...	51	6	96	3
Perth Observatory	53	6	111	3
Highgate Hill ...	27	3	135	3
Subiaco	56	5	133	3
Claremont ...	...	...	...	...
South-West (Metropolitan)—*cont.*				
Fremantle ...	46	6	56	6
Rottnest	28	3	54	5
Rockingham ...	42	3	96	4
Jandakot ...	30	2	72	2
Armadale ...	30	2	64	3
Mundijong ...	...	...	...	...
Jarrahdale ...	92	5	140	3
Jarrahdale (Norie)	102	4	120	3
Serpentine ...	52	4	92	2
Extreme South-west:				
Mandurah ...	25	4	93	5
Pinjarra (Blythewood)	36	3	101	3
Pinjarra ...	45	3	75	3
Upper Murray ...	55	5	60	5
Yarloop	169	5	92	4
Harvey	85	5	66	4
Brunswick ...	101	2	103	2
Collie	114	3	88	2
Glen Mervyn ...	201	2	108	2
Donnybrook ...	160	5	83	3
Boyanup ...	178	3	99	5
Bunbury ...	122	4	63	3
Elgin	110	4	64	4
Busselton ...	85	5	43	5
Quindalup ...	159	5	70	4
Cape Naturaliste	121	4	79	5
Glen Lossie ...	163	...	85	2
Karridale ...	237	7	75	6
Cape Leeuwin ...	224	11	85	8
Lower Blackwood	96	3	...	...
Ferndale ...	94	4	70	3
Greenbushes ...	96	3	69	3
Cooeearup ...	91	4	...	...
Bridgetown ...	135	4	57	4
Hilton	99	4	50	2
Greenfields ...	186	5	...	...
Dunninup ...	117	2	59	2
Cundinup ...	150	3	28	1
Wilgarrup ...	119	7	77	6
Balbarrup ...	109	2	...	...
Bidellia ...	...	...	...	...
Westbourne ...	200	8	66	7
Deeside	107	4	...	...
Riverside ...	123	5	...	...
Mordalup ...	167	4	67	4
Lake Muir ...	153	6	...	...

RAINFALL—*continued.*

Stations.	March, 1907.		April, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Eastern Agricultural Districts:				
Walgo	236	5	25	2
Emungin ...	...	...	...	...
Dowerin ...	108	5	14	2
Warramuggin ...	..	...	...	...
Oak Hill ...	...	...	..	...
Baker's Hill ..	127	3	...	
Monglin	...	...	..	...
Hatherley ...	...	...	...	..
Momberkine ...	...	...	.	...
Bolgart	...	...	..	...
Eumalga ..	68	5	27	3
Newcastle ...	40	2	12	2
Craiglands ...	68	4	106	2
Eadine	37	3	69	3
Northam ...	161	6	21	3
Grass Valley ...	128	5	21	1
Cobham	69	6	43	3
York	76	6	64	3
Burrayocking ...	88	7	34	3
Meckering ...	138	4	20	1
Cunderdin ...	109	5	..	.
Doongin	74	3	...	..
Whitehaven ...	110	5	.	..
Mt. Caroline ...	176	6	20	1
Cutenning ...	211	7	30	3
Kellerberrin ...	130	6	38	3
Cardonia ...	165	8	24	3
Baandee ...	174	4	23	1
Nangeenan ...	152	5	27	2
Merredin ...	120	4	26	1
Codg-Codgen ...	128	5	...	...
Noongarin ...	...	.	...	...
Mangowine ...	127	6	...	...
Yarragin ...	122	4	...	...
Wattoning ...	102	3	...	
Koomberkyne ...	89	9	27	3
Great Southern Railway Line:				
Dalebridge ...	30	4	83	2
Beverley ...	78	4	66	3
Brookton ...	48	5	23	2
Sunning Hill ...	52	5	11	2
Pingelly ...	79	7	16	2
Yornaning ...	47	4	26	2
Narrogin ...	82	5	48	2
Narrogin State Farm	156	5	64	2
Rose Hill ...	49	4	...	...
Wagin	87	3	35	3
Great Southern Railway Line—*contd.*				
Katanning ...	137	5	41	2
Sunnyside ...	47	3	24	2
Broomehill ...	62	3	22	2
Woodyarrup ...	206	6	33	3
Pallinup ...	207	2	18	2
Tambellup ...	178	4	...	...
Toolbrunup ...	104	1	16	2
Cranbrook ...	123	7	43	6
Stirling View ...	231	10	25	4
Kendenup ...	151	7	54	5
Woogenellup ...	206	9	...	...
Woodburn ...	241	6	...	...
St. Werburgh's...	240	12	...	...
Mt. Barker ...	254	9	55	6
West of Great Southern Railway Line:				
Talbot House ..	44	4	86	2
Jelcobine ...	21	1	29	2
Bannister ...	134	3	...	...
Wandering ...	156	4	44	3
Glen Ern ...	...	...	...	...
Marradong ...	92	3	71	2
Wonnaminta ...	78	6	41	2
Williams ...	81	4	52	2
Rifle Downs ...	83	3	...	...
Darkan	...	...	...	...
Arthur River ...	57	4	37	2
Gainsborough ...	31	2	31	2
Glenorchy ...	90	5	45	2
Kojonup ...	113	5	15	3
Blackwattle ...	124	2	36	3
Warriup ...	147	9	38	10
Forest Hill ...	235	9	79	7
East of Great Southern Railway Line:				
Sunset Hills ...	34	1	65	3
Oakdale	51	3	...	...
Barrington ...	60	1	69	2
Bally Bally ...	29	6	77	3
Stock Hill ...	4	1	31	2
Qualin	64	5	64	2
Woodgreen ...	52	7	63	3
Glenallan ...	81	5	33	1
Gillimanning ...	39	5	15	2

RAINFALL—*continued*

STATIONS	MARCH, 1907		APRIL, 1907	
	No of Points 100 = 1in	No of wet days	No of points 100 = 1in	No of wet days
EAST OF GREAT SOUTHERN RAILWAY LINE—*contd*				
Wickepin	44	4		
Crooked Pool	65	2	46	2
Nallyring	95	6		
Yardup	125	10		
Bunking	49	1		
Bullock Hills	78	2		
Dyliabing	95	4	44	3
Glencove	102	4	13	2
Cherillalup				
Mianelup	112	4		
Woolganup	101	1	15	1
Chillinup	213	3		
Jarramongup				
Uberin	103	5		
SOUTH COAST				
Wilson's Inlet	174	10	116	6
Grasmere	145	12	126	8
King River	120	9		
Albany	187	11	101	7
Point King	190	5	116	3
Breaksea	253	15	119	14
Cape Riche	201	5		
SOUTH COAST—*contd*				
Peppermint Grove	173	9		...
Bremer Bay	173	9	99	4
Coconarup	210	11	61	4
Ravensthorpe	253	11	34	6
Cowjanup				
Hopetoun	140	10	63	4
Fanny's Cove	163	6		
Park Farm	184	8	80	3
Grass Patch	202	8		
Swan Lagoon	176	7		
30-Mile	188	8		
Gibson's Soak	159	9		
Myrup	147	10	100	5
Esperance	178	11	131	8
Boyatup	182	7		
Lynburn	177	8		
Cape Arid				
Point Malcolm	218	9		
Israelite Bay	295	11	26	6
Nannambinia	321	10		
Balbinia				
Balladonia	310	10	16	3
Eyre	365	6	4	2
Mundrabella				
Eucla	119	5	66	6

The Observatory, Perth
8th May, 1907

W E COOKE,
Government Astronomer

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OUR APPLE INDUSTRY

Views taken from Mr H Robinson's "Omrah" orchard Mt Barker

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NOTES.

Irrigation Plants.—It is the intention of the Agricultural Department to erect small irrigation plants for treating ten acres and over, to settlers and farmers on easy terms. Applications and further particulars may be obtained from the Under Secretary.

Seed Potatoes.—In this issue is published a report from Mr. G. Berthoud, Manager of the Hamel Experimental Farm, dealing with potato trials from seed recently procured from Messrs. Sutton & Co., England. The produce of a number of the varieties are for sale, and can be obtained at market rates by writing direct to the Manager.

National Show.—It has been decided that the National Show, to be held at Northam this year, will be opened on the 24th October, and continued for three days. The Hon. the Minister for Agriculture, Mr. James Mitchell, M.L.A., has agreed to the National Show being held at Busselton next year, 1908. This notice will give all ample time to prepare, and the decision should give satisfaction to all interested.

Butter Factory.—Messrs. Hales and Baldock are making strenuous efforts throughout the South-Western Districts to establish an up-to-date butter factory. The gentlemen mentioned are visiting many centres of population, holding meetings, and interviewing farmers and others personally, for the purpose of securing promises of assistance and support. From the encouragement received there is every reason to believe that a sure foundation will soon be laid of this most important industry.

Silos.—Now the winter is with us there will be many rainy days that prevent the farmer from following his usual occupation of tilling the ground. The time, however, might with great advantage be made use of for the preparation of the material for building a silo in early spring. With the impetus that the dairying industry has obtained, the building of silos must follow as a necessary adjunct to it. This being so, the material for building should be obtained and got ready for putting together at the proper time.

Replanting Vineyards.—Owing to the fact that a large number of vineyards in Victoria require replanting, the Government of that State has decided to send an expert to Europe whose duty will be to travel and inspect the most up-to-date vineyards in France, Spain, Portugal, and other European countries. The engagement will be for two years, at a salary of £300 per year. Mr. F. de Castella, of the Chateau Dookie, has, we learn, been appointed to carry out that mission of investigation.

Egg-laying Competition.—In the forthcoming egg-laying competition to be held at Subiaco, commencing on 1st July, an innovation has been made in the establishment of two special pens, one for common, or barn-door fowls, and the other for common nondescript ducks. The occupants of the two pens will be fed and treated in exactly the same way as all other birds, the idea being to give a practical illustration of the value of pure bred fowls and ducks over the common mixed breeds. These birds will not compete for any of the prizes offered.

Wonderful Lucerne.—In referring to the report that tick-infested cattle in Queensland turned into lucerne paddocks shed their ticks and come out cured, an *Exchange* remarks that a lucerne paddock will perform greater miracles than that. So great is the growing power of lucerne that it has been known to lift mortgages of the largest size off a farm. Lucerne fills the milk pail, improves the fleece, fattens the porker, overflows the egg basket, enriches the soil, doubles the value of land, and swells the bank balance. So there need be no surprise that it will do a little thing like banishing the cattle tick.

Dairy Cows and Sheep.—Applications are now being received by the Under Secretary for Agriculture from persons wishing to purchase either cows or breeding ewes. In order to assist the farmer and to encourage the development of the dairying industry, animals will be supplied either singly or in number on deferred payments, which will extend over a period to suit the purchaser, with the approval of the Hon. the Minister. Animals will be sold at cost price, security must be given for fulfilling the purchase conditions. Application forms, and all further information may be obtained from the Department.

Silos.—It is the intention of the Hon. the Minister for Agriculture to further assist the dairyman, farmer, and settler by supplying, on easy and deferred payments, good, substantial silos. Plans and specifications have been obtained for the supplying of forty silos. Secretaries of Agricultural

Societies have been written to for suggestions as to the most suitable localities for the erection of a silo, and where it will prove of most value as an object lesson. Ensilage making has now become such an important factor in general dairying and stock raising, that a silo is admitted a necessary adjunct to all farm buildings.

Seed Catalogue.—We have received from Messrs. Wilson & Johns, of Barrack Street, Perth, a copy of their seed catalogue. It has been compiled with the main idea of placing a selection of the best kinds of seeds, plants, and trees before the reader, together with sound practical notes on general cultivation. This firm has made a name for itself during the last few months by the trade they have done in supplying seed and plants of the famous Rhodes grass, and plants of the African Wonder grass. They are also doing a big trade in fruit trees. Readers should send for a catalogue which will be sent post free.

Food for Calves.—In addition to the skim-milk from the separator, on which they have been mainly reared, the calves have received oilcake mixed with the milk. This article, which is a cocoanut cake, not linseed, possesses the great advantage over pollard, oatmeal, oils, and many of the patent mixtures for calf-rearing, that it does not scour the calves. It dissolves readily in boiling water. Calves are soon brought to take it, and after they become fond of it may be given with advantage from ½lb. to ¾lb. per calf per diem. When the cake is used with skim-milk individual feeding is best, but where big calves are fed together in a trough it is necessary to keep on stirring the milk whilst the calves are drinking. Where this oilcake is used the calves soon show its good effects by their healthy skins and improving condition.

Killing Fruit Flies.—In a report to the Under Secretary for Agriculture, Mr. T. Hooper, the Chief Inspector under the Insect Pests Act states, that in combating the ravages of the fruit fly he carried out a series of trials for the purpose of finding out the best means of killing them. The materials used were kerosene, turpentine, benzine, and naphtha, placed in tins and scattered about the orchard, where they were allowed to remain for twenty-four hours ; at the expiry of this time the tins were examined with the following results :—Turpentine :—6 tins used, 2 flies found in one, all the rest empty and dry. Benzine :—8 tins used, 1 fly in one and 4 in another, all tins dry. Naphtha :—4 tins used, no flies caught, all tins dry. Kerosene :—6 tins used, 149 flies caught (every tin containing some), all tins moist.

Jute Cultivation.—At the present time there is a great demand for jute, the cause of which is not stated; the fact, however, has given rise as to the possibilities of growing it in the northern parts of this State. For the information of those who are contemplating starting this industry, the following extract taken from a bulletin published in India on the extension of jute cultivation in India will be found of interest :—"The conditions favourable for jute cultivation are summarised as a high temperature, a deep soil of fairly fine texture, a rainfall of over 40in. so distributed that the young plants have plenty of moisture to grow vigorously, but the bulk of the fall taking place when the crop is more mature, and a sufficient supply of clear water for retting." Then, in addition to requisite climatic conditions, the labour question has to be considered.

Brooding Chickens.—Millions of healthy chickens die yearly because of too hot or too cold or too poorly ventilated brooders (writes Jas. E. Rice, of the College of Agriculture, Cornell University, U.S.A). The first need of a young chicken is heat. Heat helped it to come into the world ; a lack of heat will send it out of the world. At all times it must be able to find a temperature of 100 degrees. If a chicken were compelled to remain in a temperature of 100 degrees it would be as fatal as the inability to get into that temperature. Every brooder should provide an opportunity for the chickens to choose the temperature most agreeable to them. They will begin to do this when a day old, if the brooders are properly constructed. A close observer will discover that a chicken's actions from birth to maturity are controlled by two instincts. One is intuitively to go from a lower to a higher point. Placed on an incline, it instinctively runs upward, and hesitates to run downward. The second instinct is to go towards the source of heat, from which it derives strength and comfort. Coupled with these instincts is the bump of location—the largest bump in the chicken's head. It never forgets the place where it has found protection and comfort, and will seek it naturally after the first experience.

South African Fruit in New York.—In a recent issue of the *New York Journal of Commerce*, the following interesting paragraph appears :—" The importation of fresh fruit from South Africa, which has been in progress by Steinhart and Kelly during the past two months, has shown that in future years this industry will probably develop into considerable proportion. The fruit has arrived here in prime condition, despite the immense journey it makes, and has found a ready market, even at the excessive prices it has brought. The peaches, pears, and plums which have come here this winter have been handsome fruit, and remarkably well packed; each piece is carefully wrapped in paper, then packed *in excelsis*, and finally enclosed in a strong well-made wooden crate. Kept in cold storage, the fruit goes from Cape Town to England, and is then transhipped there, reaching here in from twenty-six to thirty days after shipment. Peaches are packed 18 in a case, and have sold here at from 75 cents (3s. 1½d.) to 3 dol. 50 cents (14s. 7d.) a case. Pears are packed 24 to 30 in a case, and have averaged about 2 dol. (8s. 4d.) a case ; while plums, 36 to 42 in a case, have brought from 1 dol. 25 cents (5s. 1½d.) to 2 dol. 50 cents. (10s. 5d.). It is estimated that probably 10,000 cases of the fruit have been marketed here this winter, and the receipts now are about a thousand cases a week."

Bagging Wheat.—The loss that farmers sustain in selling their bags as wheat was discussed at a recent meeting of the Mount Pleasant Agricultural Society, South Australia. Mr. Royal, who introduced the discussion, considered that the present practice of buying bags at 7s. 6d. per dozen, and afterwards selling them as wheat at 2s. 9d. per bushel weight, was unfair, and greatly to the disadvantage of the producer. The merchant who sells the bag secures a profit, and after the bag is filled and sold with wheat the farmer only receives equal to about 2s. 6d. per dozen for bags which originally cost him 7s. 6d. per dozen. Placing the price of bags at, say, 7s. per dozen, he pointed out that in a harvest of 2,000 bags the cost would amount to about £58, and by selling the bags as wheat at 3s. per bushel the returns for the bags would be about £15, a loss of £43 in one year's transactions. The only remedy, it was concluded, lay in the introduction of bulk handling of grain, and that seemed to be so much opposed by the railways and the shippers that little hope presented itself in the way of a change.

Wool Growing.—Nowhere in the world has sheep-farming been carried on with greater success, or on a larger scale, than in our Australasian colonies, and nowhere has the effect of climate and breeding been more marked in the improvement of wool. There were no sheep native to the soil, and the first were introduced from India. Those introduced were of poor quality. They had large heads and slouch ears, narrow in the chest and shoulders, with long legs, high-curved backs, and a coarse, hairy fleece, more resembling goats than sheep. Even these sheep, under the influence of the splendid climate and feed, became essentially changed in character, and in the course of a few years lost all their hair and increased the growth of wool. The success of the Merino sheep in every part of the world led to their introduction into Australia, and the third or fourth cross with the prevailing sheep of the colony produced an animal with the fleece equal in quality, and some even rivalling, the finest Saxony. Henceforth the production of wool became the great staple trade of the colony, and the millions of sheep which are spread all over the island continent, are second to none in the world.—*Elder's Review.*

Agriculture Lecture.—On Friday, 31st May, Mr. P. Wicken, the Field Officer of the Department, delivered a lecture at Pingelly. The subject taken was that of grasses and fodder plants. The lecture was illustrated by means of lantern slides. Mr. Wicken called special attention to the fact that it was necessary that the settler should have more than one crop to depend on, to provide him with a living with the price of wheat at the present low figure. Wheat-growing by itself would hardly provide the average farmer with the requirements of life, but when it was combined with other pursuits such as sheep-breeding, the two together could be made to pay handsomely. In the past sheep have been reared and fattened on the native pastures, but settlers are beginning to realise that by improving these pastures by means of cultivation and the sowing of improved grasses and fodder plants, the carrying capacity of their land can be very considerably increased. A combination of deep-rooted grasses and leguminous fodder plants make about the best mixture that can be sown for this purpose. Illustrations of the most suitable varieties were shown on the screen, and notes on their cultivation and value supplied. Owing to the night being cold and wet, the attendance was not as large as might have been expected, but those that attended were greatly interested in the subject.

Grooming Horses.—One of the most misused articles about a stable is a curry-comb, particularly the old-fashioned kind with sharp teeth. The curry-comb, when used on a horse at all, should be employed with judgment, otherwise it does more harm than good. As a method for ruffling the temper of a horse, there is hardly anything more effective than a curry-comb roughly used. It is bad enough at this time of the year, when the coats are short, and there is only dust to deal with ; but in winter, when the mud, after a hard day's work, has caked on various parts of the animal's frame, and the curry-comb is used to scrape it off, and incidentally to tear a considerable quantity of hair out by the roots, the tool becomes an instrument of torture. "In grooming horses," writes the *Farmer's Advocate*, "main reliance should be placed upon the brush. The comb should be used to clean the brush, and is sometimes serviceable for direct application, though it ought to be rubbed in the direction the hair lies. Some men will ruffle the whole coat with the comb, in order to loosen the dirt and remove traces of scurf among the hair. The hard teeth of the comb injure the skin, and thus produce more scurf than they remove. The secret of keeping a horse's coat in good condition is to use the comb but seldom, and the brush moderately, taking pains not to rub the hair the wrong way. A little regular brushing is better for the coat than a great deal of reckless currying, and very much better for the horse's disposition."—*Australasian.*

Insect Pests Act.—New Regulations under the Insect Pests Act were gazetted on the 14th June. The main features in which they differ from those previously in force may be enumerated as follows :—All consignments of fruit, or portions of consignments, consisting of one or more varieties of fruit of which 10 per cent. of the cases in the consignment, or of the said portion therof, are found to contain fruit infected by fruit fly, shall be destroyed. Instead of 15 per cent. as formerly. All consignments of fruit found to contain fruit infected by codlin moth shall be absolutely destroyed. Fees are charged on the number of cases instead of by weight. All fees payable under these Regulations shall be payable in advance, and before the work of inspection be commenced. Consignments on which fees have not been paid within 12 hours of delivery may be destroyed or otherwise disposed of as the Under Secretary for Agriculture may direct. No charge shall be made for the destruction of waste or condemned fruit. In the event of the total destruction of a consignment, the Under Secretary for Agriculture may, if in his opinion the circumstances warrant it, grant a remission of not more than 75 per cent. of the inspection fees paid on the condemned consignment. Under previous regulations inspection fees were charged on cases delivered only, and an extra charge made for destruction of waste or condemned fruit. By charging for the whole of the consignment, any waste or condemned fruit is destroyed free.

MULE BREEDING.

By J. L. Burns, V.S., Acting Chief Inspector of Stock.

I feel sure that if the mule was more generally known in Australia he would be more sought after than at present, and the following few facts in regard to this curious animal may prove of interest and stimulate some of our large stock breeders to obtain further information on the matter. Without a doubt the mule is a wonderful creature. In North and South America they are bred extensively—those of Kentucky, Minnesota, and Missouri being well known. The Mexican mules, resulting from the ass crossing with Mustang mares, also have a high reputation.

In Europe, France, Spain, and Italy are, however, the main sources of supply. Spain at the present moment has nearly 1,000,000 mules and 1,300,000 asses. As regards quality, Poitou, which is one of the principal centres of asinine production of the whole world, still holds a very high position. This remarkable breed has contracted characteristics so different to all others that local superstition attributes something of the supernatural to it. It is here that mules are bred for almost the whole of Europe. About 50,000 mares are kept for mule production. A horse which is born in Upper Poitou is a cause of regret, while the birth of a mule is a cause of joy.

Asia Minor, North and South Africa, Cyprus, Syria, and Persia, also China, may be included in the list of places from where mules may be obtained. It is a significant fact that the best places for mules are those which are not renowned for good horses. Mule-breeding probably pays better than horse-breeding, for the progeny require less trouble in rearing, and are bought at a high price. Of course it must be understood that the mule is a working animal and nothing more ; the foal is a possible progenitor of future horses. So well is this understood in France that the Stud Department there has had to adopt measures to repress or discourage the breeding of mules.

The French in Algeria found the mules very sure-footed, strong of limb, and hard of hoof, a remarkable power of ascending and descending steep places and of cleverly turning sharp corners ; sure on the worst of roads, quiet, easy to please as regards food, tolerant of heat and thirst, requiring drink less often and less in amount than the horse, more intelligent than is generally thought, far less stubborn than some people, and quite susceptible of attachment and amenable to good treatment and kindness. My own experience of the mule throughout the late Boer War, and I often came in contact with him, was that he was a model animal of transport. I saw him ridden, driven, and used for pack purposes, and cannot remember an occasion when he was found wanting. Like the ass he enjoys an extraordinary immunity from disease, although he suffers severely from some specific affections such as glanders, which is most acute in the mule. He is also, for some reason or other, very liable to tetanus from trifling injuries. He certainly gives little trouble over shoeing, and indeed may be left unshod, behind especially, for a long time without detriment. He is rather choice in his selection of water, and cold water is unsuited to him. He works longer than the horse, but takes somewhat longer to mature. He inherits the sobriety, patience, endurance, and surefootedness of the ass, and the vigour, strength, and courage of the horse. Making allowance for size, he carries a weight one-third as large again as that of the horse ; so he is essentially a pack animal. Unfortunately some of the unjust opprobium which hangs in European countries about his progenitor, the ass, still influences the popular views of the mule. In this age of utility, however, it is being among other things, steadily lived down, and anyone who is really acquainted with this animal will not, I am sure, hesitate to put in a good word for such a useful and interesting hybrid.

FARM NOTES FOR JULY.

By Percy G. Wicken.

As far as present indications go the season promises to be a late one, and owing to the first useful falls of rain coming later than usual sowing operations are somewhat backward. The earlier sown crops are beginning to tinge the ground with green, and it will not be long before the bulk of the crops sown are above ground. Heavy rain has been falling for the past two days, and this will no doubt put an end to the seeding operations in low laying places. After the ground once becomes thoroughly wet only well-drained land should be worked, as land which is worked while in a saturated state soon becomes puddled and dries up to a caked mass, and the crops never grow on it successfully. The price of wheat has reached bed-rock, and it is necessary that the farmer should give the greatest care and attention to the cultivation of his soil so as to secure the highest yield possible. A poor crop of wheat does not pay working expenses, but if by means of improved methods of cultivation the farmer can convert the ten-bushel crop of previous years into a 20-bushel crop next year, he will most likely change his non-paying crop into a profitable one. There are thousands of acres of wheat crops sown in this State from which 10 bushels are obtained, where by a little extra attention, 20-bushel crops could be reaped.

During the many wet days experienced at this time of the year the opportunity should be taken of repairing and cleaning the farm harness and machinery, and doing necessary repairs and alterations about the stables and farm buildings.

A matter much neglected by farmers is that of an annual stocktaking. By this means the year's operations can be reviewed and a balance-sheet made out. The end of June is a good month for this purpose, as it is the slack time of the year ; all farm crops are harvested and the produce mostly sold, the coming season's crops sown, lambing has been completed, and a correct estimate of the increase of stock can be obtained.

Except in well-drained warm land, any seeds of grasses, rape, lucerne, etc., which have not been sown by the end of June, are better left until the early spring months, as if sown while the ground is cold and wet they do not flourish, and better crops are obtained from seeds sown in the spring when the plants are enabled to make more rapid growth and soon pass those sown in the winter.

Owing to the excessive amount of rain which falls during the winter months the question of drainage is an important one to W.A. farmers, but so far it has received very little attention. For the guidance of those desiring information on this subject the following notes on the drainage of land may prove useful :—

DRAINAGE OF LAND.

Too much attention cannot be paid to this subject. Artificial draining is the primary part of successful agriculture. In the early days of Rome, the draining of land was extensively carried out. Cato, Pliny, and other early Roman writers all mention draining, and some of them give instructions for the making of drains. A man named J. Elkington, of Warwickshire, was the founder of draining in England in 1763. He drained his land deeply, and the Government of his day were so satisfied with the system that they presented him in 1795 with £1,000 as an acknowledgment of his service to the cause of agriculture.

How to know when Draining is necessary.

1. Whenever after rain water remains in the furrows or stump holes.
2. When the soil sticks to your shoes or horses' feet and farm tools.
3. Whenever you see water in the footprints of a horse or other animal.
4. When animals sink deeply into the soil.
5. When the rays of the sun form a hard crust on the soil.
6. Whenever after heavy rain the little holes in the ground show more water in them than in other parts.
7. If after rain a stick is put into the ground and taken out water will rise in the hole.
8. If crops will grow better when the land is gathered up into small ridges.

In the first place we get rid of the stagnant water, both on the surface and below it. Stagnant water has an injurious effect on vegetation, it is deprived of its oxygen, and while it remains in the soil it prevents fresh water containing oxygen from taking its place. Water held in suspension is detrimental to plant life and must be kept moving ; while doing this it opens the pores and lets the air penetrate the soil.

The theory of draining is well illustrated by a flower-pot with a hole in the bottom, the water will either give life or death to the plant ; it gives life when it can pass through the pot, but plug the bottom up and let the water stop, and death is the result.

Water makes the ground too cold by continual evaporation taking place; the plants like moisture, but like heat too.

Some Benefits to be derived from Draining Land.

1. Draining removes stagnant water from the surface and subsoil.
2. It lengthens the season ; well-drained land can be worked much sooner after rain.
3. It deepens the soil.
4. It warms the soil by stopping evaporation.
5. It equalises the temperature of the soil.
6. It carries down soluble substances to the roots of the plants.
7. It prevents injury from drought.
8. It improves the quality and quantity of the crops.
9. It increases the effect of the manures.
10. It prevents the heaving of the soil.
11. It helps to prevent disease, such as rust in wheat and rot in potatoes, etc.
12. It increases the general health of the locality.

A good soil, with a gravel subsoil, need not be drained, but with a stiff clay subsoil it is necessary. The deeper the drains are the further apart they may be placed.

In early times, straw, brushwood, poles, gravels, stones, etc., were all used for draining.

Straw has been used for many years with good results.

Open drains are objectionable, as they interfere with the working of the land, but are decidedly better than none at all.

Before commencing to lay down a system of drains, an outlet for the main drain must be found, and the drains marked out so as to give the necessary fall, a fall of 3in. in a 100ft. will be sufficient ; the bottom of the drain should be kept smooth, and must be carefully graded. Care must be taken to avoid, if possible, bringing the subsidiary drains in at right angles to the main drain, as this impedes the flow of water at every junction. The main drain should be made amply large enough to carry off the water from all the feeders.

Great difference of opinion exists as to the depths of the drains, they vary from 1½ft. to 6ft., much depends on the nature of the soil ; retentive soils require deep drainage, the deeper the drains the wider they may be apart. All drains should be placed sufficiently deep to be out of reach of the plough and subsoiler, as one break will destroy the use of the whole drain My experience is that no drain should be nearer the surface than 30in , our subsoilers often work 20 to 22in deep, and they are not so easy to handle as a plough, and on coming to a soft place, such as a drain, are apt to sink in some distance and destroy the drain

METHODS OF MAKING DRAINS

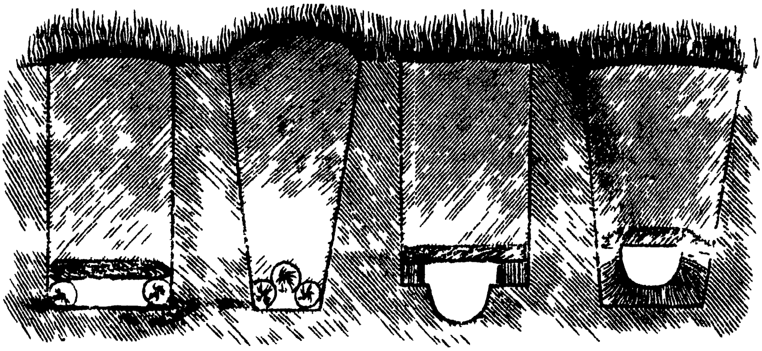

FIG 1 FIG 2 FIG 3 FIG 4

Slab and Pole Drains

Figs 1, 2, 3 and 4 represent various ways of laying slab and pole drains Drains constructed in these patterns are very effective and almost everlasting, and where the timber can be obtained easily or close at hand, are the cheapest form that can be constructed , care must be taken to place turf or some bushes over the joints to prevent the soil from leaking in and choking the drain

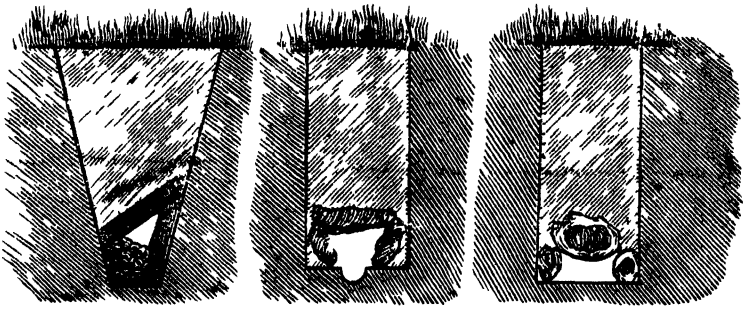

FIG 5 FIG 6 FIG 7

Stone Drains

Figs. 5 6, 7, 8, and 9 represent various ways of laying stone drains, according as to whether flat or round stones are available, the main object being to so pack the stones as to leave an open channel along which the water can run Fig 9 represents a drain made of small broken stones, but this style of drain soon becomes choked, as, however carefully they are covered, the soil soon finds its way between the small stones and the drain becomes useless.

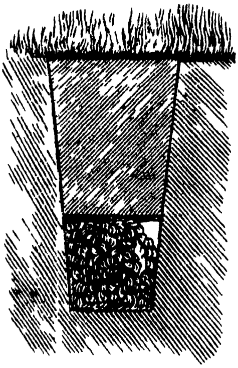

Fig 8

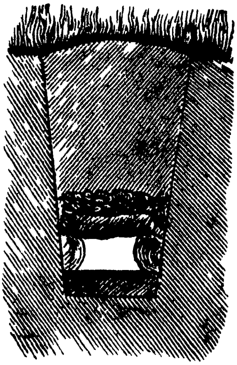

Fig 9

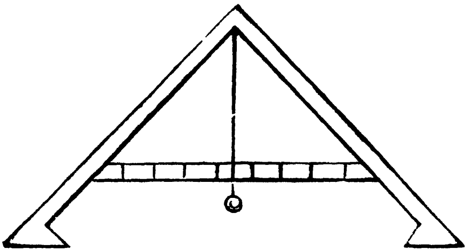

Fig 10

Fig 10 is a sketch of a small triangular level which is very useful for grading the bottom of the drains, but where a long distance has to be done, a set of boning rods are much easier

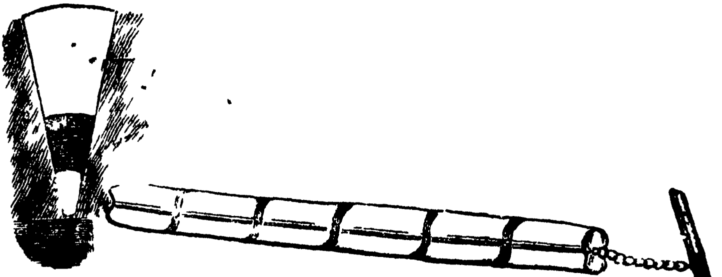

Fig 11

Fig. 11 is the system of plug-draining, which is only suitable for stiff clay soils, but is cheap and effective, the drain is opened up and the plug laid in the bottom and the clay well-packed round it, the plug is then withdrawn and is available for the next length.

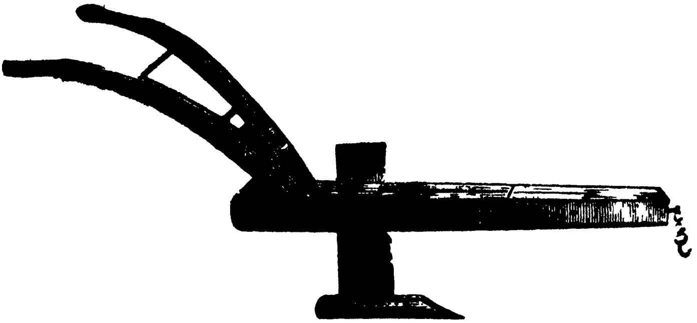

FIG 12

Mole Draining

Fig 12 represents a simple form of the mole plough This implement is somewhat similar to the ordinary subsoil plough, but instead of the apparatus for breaking up the soil, a thin steel coulter is used, to the end of which a round piece of steel is fixed of the required diameter and pointed at one end, this is let into the ground the required depth and drawn along by a team of bullocks, or other available power This is the cheapest form of draining, but is only useful for flat country and clayey soil Several forms of mold ploughs are put on the market by different firms of implement makers

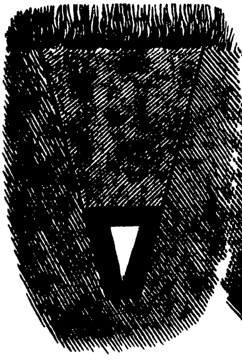

FIG 13

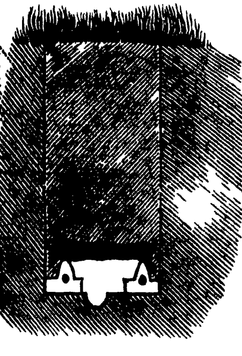

FIG 14

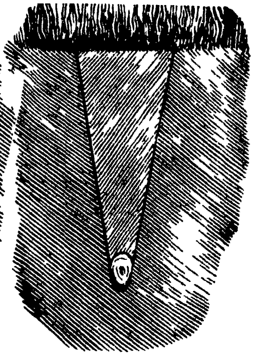

FIG 15

Tile Drainage

Figs 13 and 14 represent two methods of tile draining, which consists of laying burnt clay tiles along the bottom of the drain, and are very effective

Pipe Draining.

Fig 15.—This is by far and away the best system of draining land. A pipe drain properly laid is practically everlasting. The pipes are round and are made of burnt clay, and can be obtained in all diameters from 1in. upwards. One side of the pipe is made flat to enable it to be laid level. A 2in. pipe is the size generally used, but much depends on the length of drain and the quantity of water to be drawn off. A 2in. pipe with a fall of 3in. per 100ft. will discharge 10,575 gallons in 24 hours. In digging trenches for pipe drains, the first spit, or grass sod should be laid on the opposite side of the drain to which the earth is thrown, and when the pipes are laid the sod should belaid grass side downwards on the pipes, also a piece of bark or old tin should be laid over the joints of the pipes to keep the sand, etc., from falling in. Care must be taken that the pipes are properly graded, and they have sufficient fall to carry off the water. These pipes can now be obtained very cheaply in Perth, ranging in price from 30s. per 1,000 upwards, according to size ; they are made in 1ft. lengths.

The following table gives the number of pipes required to drain an acre of land at various distances apart, the distance must be determined by the state of the land to be drained :—

Drains Apart.		Pipes Required.	Drains Apart.		Pipes Required
ft.	in.		ft.	in.	
10	0	4,356	27	0	1,613
12	0	3,630	28	6	1,529
13	6	3,227	30	0	1,452
15	0	2,804	31	6	1,383
16	6	2,640	33	0	1,320
18	0	2,420	36	0	1,210
19	6	2,234	39	0	1,117
21	0	2,074	42	0	1,037
22	6	1,936	45	0	968
24	0	1,815	48	0	908
25	6	1 708	50	0	871

An average distance apart of drains may be taken to be about 40ft. apart, if the ground is sandy they may be further apart, but if in clay or wet ground they must be closer. The shallower the drain the closer they must be together, the deeper the drain the further apart they may be placed.

Drains should not be laid too close to trees, as the roots may displace the pipes and cause the flow of water to stop.

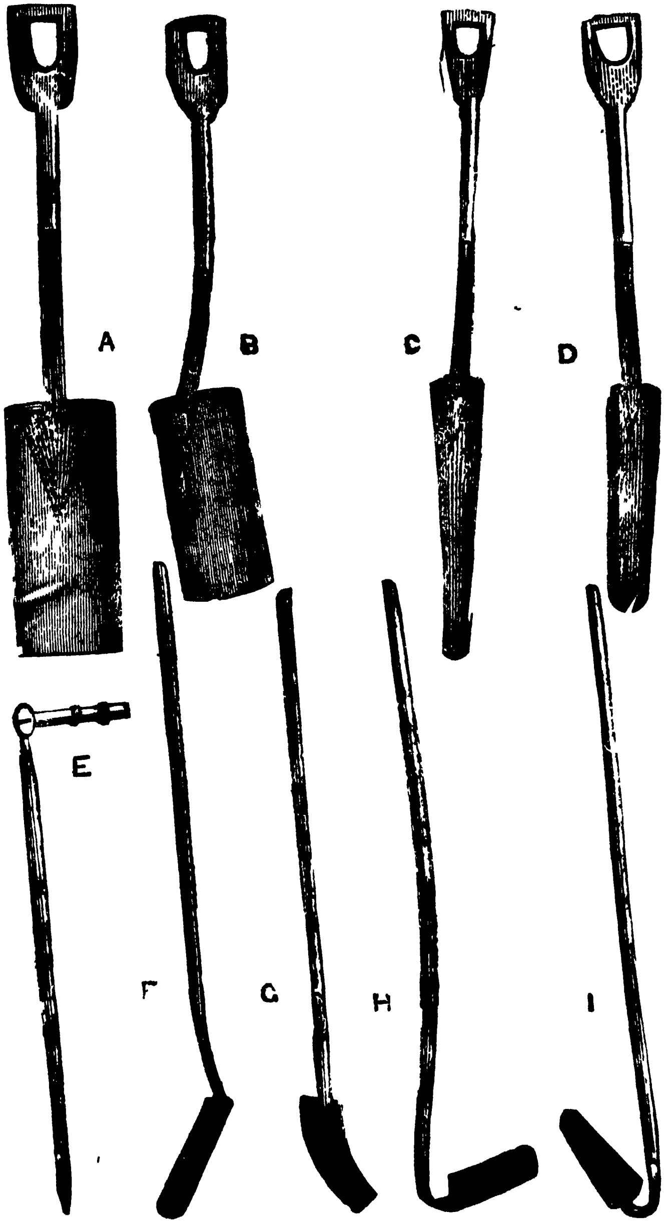

Fig 16.

Fig. 16 is a set of draining tools necessary for digging and laying pipe drains.

A. Long bitted spade.
B. Ordinary spade.
C. Half-round spade for depth.
D. A wider half-round spade.
E. Pipe layer.
F. Scöop for bottoming.
G. Flat bottoming tool.
H. For cleaning bottom of drain.
I. For cleaning bottom of drain.

A set of tools similar to this are sold in Sydney at £3 the set, and could be obtained from one of our local firms. They will be found very useful and economical for digging drains.

WHAT CAN BE DONE BY THE BEGINNER ON THE SOIL.

By Hon. Jas. Mitchell, M L A , Hon Minister for Agriculture.

Much has been said and written concerning the possibilities of successfully settling the man of small means upon the lands of this State. With the idea of showing what can be achieved by the man possessed of determination to succeed and the *sine qua non*—willingness to work, I have prepared the subjoined tables, which should prove some guide to intending selectors whose means are limited.

It is assumed that the settler has secured 480 acres C.P. and 160 acres Homestead Farm, making a total of a square mile. It is also shown that the settler allows himself £1 a week for food and £20 a year for other incidental expenses.

These statements describe the work that ought to be undertaken by the selector of this description. Of course in various localities some of the items will be varied. For instance, ringbarking has in the examples given, been put at 1s. 6d. per acre ; in some districts this price will be less, and in others greater. The same remark is applicable to the cost of clearing. However, the price does not, in the main, affect the plan of operations, inasmuch as the advances made by the Agicultural Bank are based upon the quantity of work performed, whilst the quality of the land influences necessarily the value of ringbarking and clearing, the better soil being more heavily timbered. Therefore the earning capability of the settler is neither increased nor decreased by the alteration in the cost of the work.

It is not claimed that every man who ventures will succeed ; there are many men who would fail even if they were possessed of large resources, and it often happens that those who have the largest capital produce the smallest results. But I unhesitatingly say that the land of this State will respond in the manner indicated in these schedules if the suggestions there indicated are followed out.

The work which these tables reveal can be undertaken practically by the most inexperienced worker, and while he is carrying out the preliminary work on his own land he can earn a livelihood, and at the same time acquire knowledge which will enable him to cultivate when the time for cultivation arrives. By following as closely as circumstances will permit the work outlined in the tables, the beginner will be furnished, as it were, with an exemplar which he should endeavour to work up to. And he will avoid the muddling that often results from the neophyte on the soil attempting to do too many things at once. He must steadfastly attempt one thing at a time, and do it thoroughly. He must not begin cultivating, fencing, building, and clearing at the same time.

The first schedule lays out the work as it presents itself in the drier and more lightly timbered areas of the State, and the work to be accomplished in the period of six years. The second schedule lays down the work that the settler should accomplish in the wetter and more heavily timbered areas of the South-Western Division, and is made to cover a period of four years' work, during the whole of which he is enabled, with the assistance of the Agricultural Bank, to earn a regular and continuous livelihood.

The figures have been submitted to the Managing Trustee of the Agricultural Bank, who says : "Let the selector secure good land and an advance will enable him to do all you say he can do."

FIRST SCHEDULE.

Dry Area.

First Year.

RECEIPTS.		£ s d.	£ s. d.
To Agricultural Bank—			
Loan from Bank on improvements made during year by own labour, valued as under –			
Ringbarking 600 acres at 1s. 6d.		45 0 0	
Fencing 4 miles, 6 wires			
Labour	£44 0 0		
Wire	£40 0 0		
		84 0 0	
Water Conservation			
Making of tank or dam		25 0 0	
Total value, say		154 0 0	
Amount of Advance			150 0 0
Total			£150 0 0

EXPENDITURE.	£ s. d.	£ s. d.
By Land Purchase—		
160 acres Homestead Farm		
Fee	1 0 0	
Stamp duty on declaration	0 1 0	
1st instalment of survey fee	1 10 0	
		2 11 0
640 acres Conditional Purchase		
Lease fee	0 10 0	
Stamp duty	0 1 0	
1st instalment of survey fee	2 17 6	
1st and 2nd instalments of purchase money (rent)	12 0 0	
		15 8 6
Rations for one year		52 0 0
Tools, tent, etc		20 0 0
Agricultural Bank fee at 1 per cent. on loan of £500		5 0 0
Fencing wire for 4 miles of fencing, cost delivered		40 0 0
Balance of Advance in hand carried forward to next year		15 0 6
Total		£150 0 0

Second Year.

RECEIPTS

	£	s	d
To Balance of Advance in hand brought forward from last year	15	0	6
Agricultural Bank –			
Loan from Bank on further improvements made during year by own labour, valued as under			
Clearing 100 acres £100 0 0			
Amount of Advance	100	0	0
Loan for Purchase of 120 ewes*	100	0	0
Proceeds of wool sold –			
The clip of 120 ewes at 5s. per head	30	0	0
Sale of lambs—			
The progeny of 120 ewes say, 90 at 10s	45	0	0
Total	£290	0	6

EXPENDITURE

	£	s	d	£	s	d.
By Land Purchase—						
160 acres Homestead Farm						
Balance survey fee	1	10	0			
640 acres Conditional Purchase						
Balance survey fee	2	17	6			
Third and fourth instalments of purchase money (rent)	12	0	0			
				16	7	6
Agricultural Bank—						
Interest on loan of £150 at 5 per cent				7	10	0
Rations for one year				52	0	0
Sundries for one year				20	0	0
Stock Purchases						
Purchase of 120 ewes				100	0	0
Purchase of 80 ewes after sale of lambs and wool from first purchase				60	0	0
Purchase of pigs				10	0	0
Purchase of poultry				5	0	0
Balance carried forward to next year				19	3	0
Total				£290	0	6

Third Year

RECEIPTS.

	£	s	d
To Balance in hand brought forward from last year	19	3	0
Agricultural Bank			
Loan from Bank on further improvements made during year by own labour valued as under			
Clearing 100 acres, £100			
Amount of Advance	75	0	0
Proceeds of wool sold			
The clip of 200 sheep at 5s per head	50	0	0
Sale of lambs			
The progeny of 200 ewes say 150 at 10s	75	0	0
Total	£219	3	0

EXPENDITURE

	£		
By Land Purchase—			
180 acres Conditional Purchase			
5th and 6th instalments purchase money (rent)	12	0	0
Agricultural Bank			
Interest on loan of £350 at 5 per cent	17	10	0
Rations for one year	52	0	0
Sundries for one year	20	0	0
Balance carried forward to next year	117	13	0
Total	£219	3	0

Fourth Year

RECEIPTS

	£	s	d.
To Balance in hand brought forward from last year	117	13	0
Agricultural Bank			
Loan from Bank (last instalment of £500) on further improvements made during year by own labour, valued as under —			
120 acres clearing, £120			
Amount of advance	75	0	0
Proceeds of wool sold—			
The clip of 200 sheep at 5s per head	50	0	0
Sale of lambs—			
The progeny of 200 ewes, say, 150 at 10s	75	0	0
Total	£317	13	0

EXPENDITURE

	£	s	d.
By Land Purchase—			
480 acres Conditional Purchase			
7th and 8th instalments purchase money (rent)	12	0	0
Agricultural Bank—			
Interest on loan of £425 at 5 per cent	21	5	0
Repayment 1st instalment of loan of £100 for purchase of ewes	20	0	0
Rations for one year	52	0	0
Sundries for one year	20	0	0
Balance carried forward to next year	192	8	0
Total	£317	13	0

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*Repayment of advance for the purchase of stock is made by five equal yearly instalments

Fifth Year.

RECEIPTS.	£	s	d.
To Balance in hand brought forward from last year	192	8	0
Proceeds of wool sold—			
The clip of 200 sheep at 5s	50	0	0
Sale of lambs—			
The progeny of 200 ewes, say, 150 at 10s	75	0	0
Sale of ewes—			
80 ewes at 15s	60	0	0
Total	£377	8	0

EXPENDITURE	£	s	d	£	s	d
By Land purchase—						
480 acres Conditional Purchase —						
9th and 10th instalments purchase money (rent)				12	0	0
Agricultural Bank—						
Interest on loan of £480 at 5 per cent				24	0	0
Repayment 2nd instalment of loan for purchase of ewes				20	0	0
Rations for one year				52	0	0
Sundries for one year				20	0	0
Purchase of Plant	£	s	d			
4 horses and harness	120	0	0			
Plough	28	0	0			
Cart	20	0	0			
Harrows	10	0	0			
				178	0	0
Horsefeed, chaff				20	0	0
Balance carried forward to next year				51	8	0
Total				£377	8	0

Sixth Year

RECEIPTS	£	s	d
To Balance in hand brought forward from last year	51	8	0
Proceeds of 200 acres of crop 12 bushels per acre at 2s 6d per bushel	300	0	0
Proceeds of wool sold—			
The clip of 120 sheep at 5s	30	0	0
Sale of lambs			
The progeny of 120 sheep, say, 90 at 10s	45	0	0
Total	£426	8	0

EXPENDITURE	£	s	d	£	s	d
By Land Purchase—						
480 acres Conditional Purchase						
11th and 12th instalments purchase money (rent)				12	0	0
Agricultural Bank						
Interest on loan of £460				23	0	0
Repayment 3rd instalment of loan for purchase of ewes				20	0	0
Rations for one year				52	0	0
Sundries for one year				20	0	0
Seed for 200 acres				30	0	0
Horsefeed						
For seeding	£10	0	0			
For harvesting and fallowing	30	0	0			
				40	0	0
Purchase of Harvester				80	0	0
Purchase of bags 600 at 8d				20	0	0
Balance carried forward to next year				129	8	0
Total				£426	8	0

BALANCE-SHEET AT END OF SIXTH YEAR

DRY AREA

LIABILITIES	£	s	d
Agricultural Bank			
Loan on mortgage	440	0	0
W A Government—			
Balance due on 480 acres C P land to complete purchase	168	0	0
Balance	688	8	0
Total	£1,296	8	0

ASSETS	£	s	d	£	s	d
Land						
640 acres at 10s				320	0	0
Ringbarking and clearing						
320 acres at £1 1s 6d				344	0	0
Horses (4) and harness				120	0	0
Live Stock						
120 sheep	£100	0	0			
Pigs	10	0	0			
Poultry	5	0	0			
				115	0	0
Fencing, 4 miles				84	0	0
Harvester				80	0	0
Plough				28	0	0
Water Conservation				25	0	0
Ringbarking—						
280 acres, at 1s 6d				21	0	0
Cart				20	0	0
Harrows				10	0	0
Balance				129	8	0
Total				£1,296	8	0

NOTE.—Land is valued at 10s. per acre, and the improvements, stock, plant, and machinery at cost price. On this basis the selector shows surplus assets of £688 8s. as the result of six years' work, and has a good saleable property.

SECOND SCHEDULE.

WET AREA.

First Year.

RECEIPTS.

	£ s d.	£ s. d.	£ s. d.
To Agricultural Bank—			
Loan from Bank on improvements made during year by own labour, valued as under —			
Ringbarking 600 acres at 1s 6d.		45 0 0	
Fencing 4 miles, 6 wires—			
Labour	44 0 0		
Wire	40 0 0		
		84 0 0	
Water Conservation –			
Making of tank or dam		25 0 0	
Total value, say		154 0 0	
Amount of Advance			150 0 0
			£150 0 0

EXPENDITURE.

	£ s. d.	£ s. d
By Land Purchase—		
160 acres Homestead Farm—		
Fee	1 0 0	
Stamp duty on declaration	0 1 0	
First instalment of survey fee ...	1 10 0	
		2 11 0
640 acres Conditional Purchase—		
Lease fee	0 10 0	
Stamp duty	0 1 0	
First instalment of survey fee	2 17 6	
First and second instalments of purchase money (rent)	12 0 0	
		15 8 6
Rations for one year		52 0 0
Tools, tent, etc.		20 0 0
Agricultural Bank fee at 1 per cent on loan of £425		4 5 0
Fencing wire for 4 miles of fencing, cost delivered		40 0 0
Balance of advance in hand carried forward to next year		15 15 6
		£150 0 0

Second Year.

RECEIPTS

	£ s. d.
To Balance of advance in hand brought forward from last year	15 15 6
Agricultural Bank—	
Loan from Bank on further improvements made during year by own labour, valued as under	
Clearing 12 acres at £8 6s. 8d., £100	
Amount of Advance	100 0 0
Loan for Purchase of 120 ewes*	100 0 0
Proceeds of wool sold—	
The clip of 120 ewes at 5s per head	30 0 0
Sale of lambs –	
The progeny of 120 ewes, say 90 lambs at 10s	45 0 0
	£290 15 6

EXPENDITURE.

	£ s. d.	£ s. d.
By Land Purchase—		
160 acres Homestead Farm		
Balance survey fee	1 10 0	
640 acres Conditional Purchase		
Balance survey fee	2 17 6	
3rd and 4th instalments of purchase money (rent)	12 0 0	
		16 7 6
Agricultural Bank		
Interest on loan of £150 at 5 per cent.		7 10 0
Rations for one year		52 0 0
Sundries ,,		20 0 0
Stock Purchases –		
Purchase of 120 ewes		100 0 0
,, pigs		10 0 0
,, poultry		5 0 0
Balance carried forward to next year		79 18 0
		£290 15 6

Third Year.

RECEIPTS.

		£ s d
To Balance in hand brought forward from last year		79 18 0
Agricultural Bank		
Loan from Bank on further improvements made during year by own labour, valued as under		
Clearing 6 acres at £8 6s 8d	£50 0 0	
Clearing 4 acres at £6 5s	25 0 0	
Amount of advance		75 0 0
Proceeds of wool sold—		
Clip of 160 ewes at 5s		40 0 0
Sale of lambs		
Progeny of 160 ewes, say, 120 lambs at 10s		60 0 0
Total		£254 18 0

EXPENDITURE

	£ s. d.
By Land Purchase—	
480 acres Conditional Purchase—	
5th and 6th instalments purchase money (rent)	12 0 0
Agricultural Bank	
Interest on loan, £350 at 5 per cent.	17 10 0
Rations for one year	52 0 0
Sundries for one year	20 0 0
Stock Purchase –	
40 ewes at 15s	30 0 0
Purchase of Plant	
Horse, cart, harness, plough, harrows	60 0 0
Balance carried forward to next year	63 8 0
Total	£254 18 0

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*Repayment of advance for the purchase of stock is made by five equal yearly instalments.

Fourth Year.

RECEIPTS.	£	s.	d.
To Balance in hand brought forward from last year	63	8	0
Proceeds of wool sold—			
Clip of 200 ewes ...	50	0	0
Sale of lambs—			
The progeny of 200 ewes, say, 150 lambs at 10s. each	75	0	0
Proceeds of crops, various, from 10 acres of cleared land at £5 per acre	50	0	0
	£238	8	0

EXPENDITURE.	£	s.	d.
By Land purchase—			
480 acres Conditional Purchase			
7th and 8th instalments purchase money (rent)	12	0	0
Agricultural Bank—			
Interest on loan of £425 at 5 per cent.	21	5	0
Repayment 1st instalment of stock	20	0	0
Rations	52	0	0
Sundries	20	0	0
Stock purchase, 40 ewes at 15s.	30	0	0
Seed purchase	10	0	0
Balance carried forward to next year	73	3	0
	£238	8	0

BALANCE-SHEET AT END OF FOURTH YEAR

WET AREA.

LIABILITIES.	£	s.	d.	£	s.	d.
Agricultural Bank—						
Loan on mortgage	£500	0	0			
Less repaid 1st instalment	20	0	0			
				480	0	0
W.A. Government						
Balance due on 480 acres C.P. to complete purchase	£320	0	0			
Less 4 instalments paid	48	0	0			
				272	0	0
Balance				205	3	0
Total				£957	3	0

ASSETS.	£	s.	d.	£	s.	d.
Land—						
640 acres at 10s. per acre				320	0	0
Clearing and Ringbarking—						
22 acres cleared and rung at £8 8s. 2d per acre	£176	13	0			
578 acres rung at 1s. 6d.	43	7	0			
				220	0	0
Live Stock—						
200 ewes	£160	0	0			
Pigs	10	0	0			
Poultry	5	0	0			
				175	0	0
Fencing, 4 miles				84	0	0
Plant—Cart, Horse, and Harness				60	0	0
Water				25	0	0
Balance				73	3	0
Total				£957	3	0

NOTE.—The land is valued at 10s. per acre, and the improvements, stock, plant, etc., at cost price. On this basis the selector shows surplus assets of £205 3s. as the result of his four years' work, and he has a good saleable property.

STATE PLOTS, HAMEL.

POTATOES—VARIETY TESTS, AUTUMN, 1907.

By G. F. BERTHOUD.

Varieties and Culture.

The potatoes described below were all imported stock, and grown on low land, fairly moist, without irrigation. Mode of planting with plough as follows:—The land was deeply ploughed, and left lying fallow for a few weeks. When planting, the land was opened out in furrows or ridges, three feet apart; complete manure, at the rate of half a ton per acre, was sown evenly along the bottom of these ridges, afterwards the small cultivator was run in each—to mix the fertiliser and soil thoroughly, also break up the subsoil. The whole tubers, previously soaked in formalin solution, were then set evenly along the rows, and two light furrows turned back to close the drill ; at the finish the plots were lightly harrowed to level off. Taken as a whole, the crop turned out well, and the tubers are clean and sound.

Plot A.—"The Factor" : Seed imported from Scotland, very sound. Whole set planted (by hand) on dug land, 5th January. Drills 3 feet apart, with sets 2 feet in the rows. Growth healthy and good. Strong stalks, height to 36 inches. Dug 6th May, time 17 weeks. White oblong tubers, large ; very few small ones. Set far from stalk, hard to dig. Yield good, rate per acre marketable—9 tons 11cwt. ; small, ½cwt.

Plot B.—"The Factor" : Seed imported from Scotland. Whole sets planted with plough, 18th January, in drills, 3 feet apart. Growth very vigorous and even, height to 30 inches. Dug 8th May; time, 16 weeks. Tubers large, very few below market size. Yield good, rate per acre marketable—8 tons 15cwt.; small, 1cwt.

Plot C.—"The Factor" : Seed imported from England, sound, and in good condition. Whole sets, planted 11th January. Growth, healthy and strong ; height to 30 inches. Dug 27th May, time 15 weeks, when not fully matured. Tubers white, oblong, large market size, with few small ones. Prolific ; late or main crop variety. Marketable—6 tons 15cwt.; small, 10cwt.

"Superlative" : Seed imported from Sutton's, Reading, England. Cut sets hand planted 16th January. Growth slow and weak, height to 15 inches, foliage diseased. Mature in 14 weeks. Dug 7th May, tubers medium size, creamy white, beautiful pebble-shape, with very shallow eyes. Yield light—for further trial. Yield per acre—3 tons.

"Discovery" : Seed imported from Sutton's, Reading, England. Cut sets hand planted 16th January. Several of these tubers were affected with the ring disease. Growth very weak, with diseased foliage ; height 12 inches, matured in 14 weeks. Dug 7th May, tubers white, round, neat form, shallow eyes, small, poor ; rejected. Yield per acre—2 tons 7cwt.

"Early Bird" : Local-grown tubers, being first growth from English seed. Whole sets hand planted 16th January. Growth dwarf and weak, height 12 inches ; matured in 12 weeks. Dug 7th May, tubers white, round, very nice shape and shallow eyes. Yield light ; part retained for further trial in spring. Yield per acre—2 tons 15cwt.

"May Queen" : Two hundredweights of seed imported from Sutton's, Reading, England. Whole tubers planted 12th February. Growth dwarf and weak, foliage badly diseased, height 12 inches ; matured early, in ten weeks. Dug 14th May. White kidney, many small tubers. Good cooker, but not profitable for market culture here. Yield poor ; rejected. Yield per acre—marketable, 1 ton 8cwt.; small, 10cwt.

"Sharp's Victor" : Two hundredweights imported from Sutton's, Reading, England ; tubers sound and budding nicely. Whole tubers planted 23rd January, in drills, 3 feet apart, with sets 15 inches along the rows. Growth dwarf and weak, height 15 inches, foliage badly diseased. Dug 16th April, time 12 weeks. Yield light, white kidney, tubers small and very numerous. Table quality, first-class. Not suitable for culture here. Rejected. Yield, rate per acre—marketable, 1 ton 18 cwt.; small, 15cwt.

"Walnut Leaf" : Kidney. One hundredweight imported from Sutton's, Reading, England. Whole tubers planted 24th January. Growth slow and very weak, height to 12 inches. Dug 29th April, time 12 weeks. White kidney, tuber very small. Light yield. Poor variety ; rejected. Yield per acre—marketable, 16cwts.; small, 8cwt.

"Scotch Champion" : 2cwt. seed imported from Sutton's, Reading, England. Whole tubers planted 25th January. Growth rather slow, but fairly good. Foliage distinct, light green, curled, and liable to leaf disease. Stalk tall and slender; height to 30 inches. Dug 3rd May; time, 14 weeks. White round, rough with deep eyes, tubers set close to stalk, easy to dig, with many small ones. Yield light. Rejected. Rate per acre, marketable—3 tons 8cwt.; small, 11½cwt.

"Abundant" : 2cwt. imported from Sutton's, Reading, England. Whole sets planted 25th January. Growth quick, vigorous, and healthy. Foliage wide and flat, strong stalks ; height to 30 inches. Dug 2nd May ; time, 14 weeks. White round tubers of fair even size, rather scattered, and set far from stalk, which makes the digging difficult, otherwise it is a good variety. Yield fair, rate per acre, marketable—5 tons ; small, 5cwt.

"Ninety Fold" : 2cwt. of seed imported from Sutton's, Reading, England. Whole tubers planted 12th February. Growth moderate. Foliage diseased, height to 18 inches. Matured in 12 weeks. Dug 15th May. Tubers white, oblong, numerous, but misshapen and small. Yield not profitable. Rejected for culture here. Yield per acre, marketable—4 tons 12cwt. ; small, 1 ton 5cwt.

"Reading Giant" : 2 cwt. seed imported from Sutton's, Reading, England. Whole tubers planted 13th February. Growth even, fairly vigorous and healthy. Foliage slightly diseased ; height, 18 to 24 inches. Dug 17th May, when barely mature ; time, 13 weeks. Tubers white, oblong, of fair size and quality. Fair market variety. Yield per acre, marketable—3 tons 14cwt. ; small, 11cwt.

"Imperator" : 2cwt. seed imported from Sutton's, Reading, England. Whole sets planted 14th February. Growth upright, strong, and fairly healthy ; height, to 30 inches. Dug 22nd May ; time, 14 weeks, but not matured. Tubers white, round, rough shape. Late variety ; yield, fair. Yield, rate per acre, marketable—4 tons 13cwt. ; small 17cwt.

"Flourball" : 2cwt. imported seed from Sutton's, Reading, England. Whole sets planted 14th February. A large proportion of these failed to come up, and those that did grow made very weak plants. Dug 22nd May ; time, 14 weeks. Tubers red, round, with deep eyes. Yield light. Rejected, not suitable here. Yield per acre, marketable—13cwt. ; small, 17cwt.

"Carman No. 1" : Victorian seed which reached here late, and in very bad condition. Whole tubers planted 18th February. Germination slow and very uneven ; a large proportion failed. Those that did grow made strong, healthy growth. Dug 25th May ; time, 14 weeks. Tubers white, round, of nice form, and fair market size. Under more favourable conditions this is a reliable and good white market variety. Yield per acre, marketable—1 ton 19cwt. ; small, 8cwt.

NARROGIN STATE FARM.

Report for thf Month of May, 1907.

By R. C. Baird.

The weather conditions prevailing during the month have been all that could be desired for successful farm operations. The rainfall for the month was spread over eight days, and greatly facilitated ploughing and seeding operations; 290 points of rain was recorded, which was ample for present requirements. Too much rain at this season of the year renders the ground cold, and the germination of seeds is therefore much retarded. The early sown crops are making rapid growth, a crop of barley and rape sown early in April, looking exceptionally strong and vigorous.

During the month 75 acres of oats were sown. The crop comprises three varieties, namely :—Algerian, Calcutta, and Early Ripe. They are now showing above ground, and with a favourable winter should give a good return.

About 100 acres of wheat has been sown, Federation occupying the largest area.

Malting barley and Cape barley were also sown, and are now showing above ground. The mild weather experienced during the month has been most favourable to early germination and rapid growth of the plants.

The grasses sown in April have made good growth, and I am hoping to get better results this year from the experiments in grasses than was obtained last season.

10th June, 1907.

POULTRY NOTES.

The Poultry Industry on the Goldfields.

By Frank H. Robertson.

For many years past the writer has had occasion to visit the Goldfields, lecturing, inspecting, or to act in the capacity of poultry judge at one or other of the poultry shows, and has thus been enabled to watch the progress of events in this direction with much interest. Dating back to 12 years ago, when the writer successfully kept a fairly large number of laying hens at Coolgardie, which proved most profitable, considering the food bill was nil, owing to an abundant supply of waste bread, and meat, combined with what the birds could pick up around the stables, a very nice price was obtained for the eggs, ranging from 4s. 6d. to 6s. per dozen, and the breeds kept were, strange to say, Langshans and Dorkings, two varieties which one would not expect to do well in such a hot and dry climate. There were no poultry shows on the fields in those days, still, there were some fanciers, but not many; however, one of them inserted an advertisement in the *Coolgardie Miner*, calling a meeting to form a Poultry Society, but only the two of us turned up. A year or two after that Coolgardie had its first show, and has continued to hold one annually ever since. Kalgoorlie and the Boulder Shows have been important fixtures in former years, and many excellent displays have been held at both centres, metropolitan breeders sending the greater number of the exhibits. Things have altered of late. The Kalgoorlie Society is defunct; Coolgardie intends making a combined Flower and Poultry Show in the spring of the year. The Boulder Society still lives, and thanks to the energy of a few enthusiasts, is likely to continue in a prosperous condition; and the show held this month was a very successful event when one considers that, with the exception of six birds, the whole of the exhibits were Goldfields owned. The feature of the show was the display of Indian Game, shown by two exhibitors, viz., Mr. F. Whitfield and Mr. E. Tremberth. White and Brown Leghorns and Buff Orpingtons also made big entries of good quality.

In addition to making the awards at the show, the writer gave a lecture which was well attended.

Although the fancy side of poultry has declined, the utility part has made vast strides, and it would probably be hard to find many, if any, parts of the Commonwealth where more enterprise is being shown in the production of poultry and eggs for the table.

The Carisbrook Duck Ranche and Poultry Farm is still being run on a large scale, and is producing ducks by the thousand. Recently a partial change has taken place in the ownership, owing to business arrangements compelling Mr. Fuller to take up his residence in Perth; he still, however, retains his interest in the Ranche, and Mr. W. G. Boneham has come in as managing partner, residing on the farm and carrying on the work as usual, assisted by his son. Both of them are bright, alert, and not afraid of work, and are of the right material to run a big poultry farm. The extensive incubator plant remains the same, but an additional brooder shed has been erected, in which are located seven Cypher brooders. A change is to be made during the coming season in the mode of running the Cypher incubators, as the result of previous experience of Mr. Boneham, when remarkably successful duck hatching was obtained last season at his former farm, not far distant from the Carisbrook. The alteration consists in making greater ventilation by boring several holes into the front of the egg chamber, and placing a moisture tray below the eggs in each machine in which water will be kept from start to finish. It was also found that long airings are beneficial, viz., 5 minutes for the first week, 10 the second, 15 the third, and during the last week 30 to 40 minutes. This is quite upsetting the Cypher theory of no moisture and short airings, but the dry atmosphere of the Goldfields has been found unsuitable for working these machines according to the maker's instructions, especially for duck hatching.

The feeding is much on the same lines as formerly, viz., slaughter-house and hotel offal, which is all boiled and mixed with bran and pollard. The size of the stock ducks (of which there are about 1,600) has been greatly improved, owing to the careful system of selection in breeding which has always been closely followed by Mr. Fuller. A large amount of capital (something like £2,000) has been sunk in this poultry farm, which is now quite complete and fully developed, and should prove a first-class paying proposition. Mr. Fuller tells me he marketed as many as 400 dozen eggs a week last season. In addition to the ducks for the table, a large number of fowls are kept.

The consumption of water from the scheme supply is very great, but Mr. Fuller is complaining bitterly about the increased charge he is asked to pay, a heavy advance being made from 3s. to 5s. 6d. per thousand gallons. He intends entering a protest against the increase.

Another enterprising and enthusiastic poultry farmer is Dr. Ellis, at Coolgardie, who, in addition to being one of the busiest medical practitioners on the Fields, manages to find time to carry on a poultry farm on a large scale ; and is investing a large amount of capital in making the plant as complete as possible. The aim is to produce eggs for the table, and no expense has been spared in procuring stock of the best proved laying strains.

This farm, which, with recent purchase, is an area of 110 acres, and is located about 2 miles west of the township, was started some two or three years ago by Dr. O'Meara, who sent his buyer from Coolgardie to secure the stock birds in America. These were safely landed here, and consisted of about 50 White Leghorns, 50 White Wyandottes, 40 Pekin ducks ; also some very fine bronze turkeys and Emden geese ; these birds and their descendants still remain on the farm. The writer secured two fine gobblers, to be used as fresh blood for the Narrogin Farm turkeys.

The plant, which is an extensive one, consists of an underground incubator room, a long range of continuous brooders heated from a furnace with complete chicken runs attached. There are a large number of breeding-pens, cockerel and pullet runs ; but the most noteworthy addition since last year's inspection is the erection of a mammoth incubator, which is at present being used as an incubator house—its inside measurement is 16ft. x 9ft.—and will be capable of holding many thousands of eggs. The walls inside and out are of wood, packed with charcoal to a thickness of 9 inches ; the walls do not touch the ground, there being a space of a few inches to allow of a free egress of fresh air, which passes over a trough kept filled with water. The ceiling is square, but is protected by a separate roof, grouted, and running to a high point, and forms a sort of fly to the whole structure, so the temperature should be alright. The farm is in charge of a married couple, but the Doctor keeps a few fowls at his own residence, where he is devoting all his leisure moments to scientific investigation in aviculture ; he has already perfected an ingenious and serviceable trap nest, and a simple manner of marking birds by means of coloured leg bands, so that they can be readily distinguished without handling when they emerge from the trap nest. But it is with regard to fertility and artificial incubation that the doctor is chiefly engaged. His investigations are conducted with unfailing thoroughness, and on highly scientific lines, which will probably result in the discovery of valuable facts of much value to the poultry industry at large.

By means of the trap nest he has found some common hens in which Andalusian blood is apparent, to give great records—one 8-year old bird laid 80 eggs last year ; a 3-year old hen, 216 eggs in the 12 months ; another one the same age, 198 eggs, and her offspring, 156 eggs in 6 months. It is to be hoped from these records that my readers will not immediately jump to the conclusion that the barndoor is the best after all.

Among the miners at Trafalgar, near Boulder, are some as enthusiastic poultry breeders as one will find anywhere ; Mr. F. E. Tull in particular. Although he has only a small yard, it is well looked after, and serviceable fowl-houses and sheds have been made at trifling expense from old condenser tanks, which are obtained at low prices ever since the advent of the Scheme Water Supply. Old filter cloths from the battery houses also afford a cheap and serviceable material for poultry house construction. Laying strains of White Leghorn is the specialty of this breeder, and he has spent a lot of money in getting the best obtainable. He has been fortunate in also combining beauty and utility, having bred the first and special White Leghorn cockerel at the Boulder Show. Another enthusiastic poultryman is Mr. A. H. Wallis, whose yards are in the scrub land just out of the town. There are several runs, all laid out on the same economical lines, and all as neat and clean as it is possible to make them. Leghorns for eggs is the object, the little American types from the fashionable yards largely predominating. The incubators are kept in a small underground room, and as the result of careful study and experimenting, wonderful success has been obtained from a 250-egg Model Cypher's machine, run in the following manner: —The top scrim of the egg chamber was removed and replaced by perforated iron. This was done as a precaution against fire when striking matches to look at the thermometer. One of the felts was removed at the start, with which this make of machine is provided, and at the end of a week even this felt was removed. The temperature was run at 102½ degrees, which went up to 103 on about the fifth day ; it is left at that until the 11th or 12th day, the temperature then rises to 104 ; the machine is then reduced to 103 and kept at that until the 18th day, which is the last day of turning ; the temperature then rises to 105, at which it remains until the hatch is over, the door never being opened while the chickens are coming out. The eggs are just slightly turned twice a day, but no specified time is allotted for airing; this is regulated according to the temperature of the eggs when out of the machine, the door of which is left wide open while the airing is in progress. When the eggs reach a temperature of 60 degrees they are immediately returned, and never allowed to go below that. On the 18th day a cloth is dipped in hot water, wrung fairly dry, and placed over the eggs in the chamber for one hour. But the novel feature of this operator's system is the use of charcoal. A small moisture tray is fastened to the inside wall of the egg chamber ; contains about a cup of water, and in it is placed a small lump of charcoal ; the tray is taken out every day, cleaned, and refilled with fresh water, his theory being that the charcoal absorbs all noxious gases generated in the chamber. It may be correct ; anyhow Mr. Wallis gets most remarkable hatches. He says he can beat the hen hollow, and that's what we want.

Other laying strain breeders are Messrs. White, Redman, and Palmerston, all keeping neat little yards of good laying strains of fowls.

THE NARROGIN FARM.

The birds are all looking well, and nearly all through the moult. The runs (25) lately occupied by the competition now come in very well for breeding pens. Only a few of them are occupied at present, the greater portion have been ploughed, and are now growing rape or barley. The breeding pens are nearly all made up, and consist of four pens of White Leghorns, of six birds in each ; one pen is headed by a Sunnyhurst cockerel bred from the Subiaco Competition birds, another with a Levens cock, and two others with Bristow cocks, so that the progeny from all these pens should prove good layers. There are two Brown Leghorn pens. No. 1 is Dusting hens, full sisters to the Narrogin Competition birds. They are mated to a Ranford cock, full brother to the competition winners. No. 2 Brown Leghorns is 6 pullets from Dusting hens, mated to a rich-coloured cock from Albany of a good laying strain.

There are three pens of Silver Wyandottes, the hens of which are picked birds, all of our own breeding. No. 1 pen is pullets. They have started well, having laid 107 eggs for May. The male birds to each of these pens are very nice birds, the father of No. 1 pen is mated to hens.

The Buff Orpington pen consists of 6 very early hatched pullets, nice coloured birds and good layers ; the breeder they were bought from says the parents laid over 200 eggs each per annum ; they are mated to a very good Stuart cockerel.

The Black Orpington pen of 6 hens are 6 large typical birds, bred by Perth Poultry Farm, mated to a typical active cockerel of Creaser's breeding, a celebrated laying strain.

The Minorca pen consists of 6 laying-strain hens from Ranford's yard, mated to a Douglas cockerel ; the parents of this strain laid 1,425, and were third at the Rockdale Competition last year.

There are two splendid pens of extra large and typical Pekin ducks, mated to unrelated drakes.

The Indian Runner pen is 6 of our best ducks, mated to a young drake from Dusting's birds at the Subiaco Competition.

Fresh gobblers have been obtained for the Bronze turkeys, bred from birds imported direct from America by Dr. O'Meara, of Coolgardie, thus introducing quite different blood to any other in Australia.

Breeding pens of Andalusians, Indian Game, and Dorkings are in course of formation. A splendid Indian Game cock was purchased out of Boulder Show, and is mated to Plymouth Rock hens for producing table birds. Eggs for breeding purposes are now for sale from 12s. 6d. a dozen, railage paid to any station in the State. All eggs not hatching replaced, provided the old eggs are returned to the Farm, railage paid. This is a very liberal guarantee.

During the past month the sales of poultry have been very numerous. There appears to be a much brisker demand this year than last, doubtless owing to the egg-laying competitions affording such a striking illustration of the profitableness of poultry. There are still for sale White and Brown Leghorn cockerels, some splendid Bronze turkey gobblers of last season's breeding, also Pekin and Indian Runner ducks.

SUBIACO MONTHLY RECORD—MAY.

[Commenced on July 1, 1906. To close on June 30, 1907.]

FOWLS.

Six hens in each pen.

Owner and Breed.	1907. May.	Total for eleven months.
1. Sunnyhurst (S.A.), *W. Leghorn	73	1,434
2. A. H. Padman (S.A.), *W. Leghorn	73	1,277
3. S. Craig, *W. Leghorn	45	1,245
4. Ericville Egg Farm, *W. Leghorn	77	1,211
5. E. Garbett, W. Leghorn	36	1,154
6. A. H. Padman (S.A.), *S. Wyandotte	64	1,151
7. J. D. Smith, *W. Leghorn	53	1,138
8. Austin and Thomas, W. Leghorns	34	1,134
9. G. W. G. Lizars, *W. Leghorn	61	1,124
10. E. Fitzgerald, W. Leghorn	65	1,120
11. E. Palmerston, W. Leghorn	6	1,109
12. Mrs. McGree, *W. Leghorn	68	1,101
13. F. Piaggio, W. Leghorn	58	1,094
14. J. R. Parkes, Brown Leghorn	18	1,072
15. Bungalow Farm, Brown Leghorn	29	1,070
16. G. M. Buttsworth, *W. Leghorn	34	1,065
17. Bon Accord, W. Leghorn	16	1,064
18. Ryan Bros., *W. Leghorn	10	1,063
19. Adelaide Yard, W. Leghorn	66	1,055
20. J. W. Buttsworth, *W. Leghorn	33	1,042
21. F. Whitfield, Brown Leghorn	0	1,020
22. A. F. Farrant, Partridge Wyandotte	47	1,020
23. F. T. Rowe, *Black Orpington	34	998
24. C. W. Johnson, *W. Leghorn	0	972
25. A. S. B. Craig, *W. Wyandotte	56	967
26. W. J. Clarke, Brown Leghorn	5	961
27. Bungalow Farm, *W. Leghorn	22	961
28. E. Hutchinson, *Minorcas	54	947
29. H. M. Kelly, *G. Wyandotte	44	943
30. F. Whitfield, *W. Leghorn	15	933
31. L. Meatchem, *G. Wyandotte	76	931
32. B. Jones, *S. Wyandotte	76	928
33. W. Wade, W. Leghorn	26	918
34. Mrs. Hughes, *R. C. B. Leghorn	41	917
35. W. Snowdon, Brown Leghorn	0	912
36. C. Attwell, *S. Wyandotte	41	905
37 R. G. Smith, W. Wyandotte	87	893
38. O. K., *Black Orpington	29	884
39. Perth Yard, W. Leghorn	47	879
40. J. W. Buttsworth, S. Wyandotte	61	867
41. C. L. Braddock, S. Wyandotte	80	859
42. Glen Donald Yard, G. Wyandotte	71	847
43. Geo. Bolger, *Black Orpington	14	845
44. W. Snowdon, S. Wyandotte	59	835
45. A. R. Keesing, Minorcas	10	826
46. R. G. Flynn, W. Leghorn	0	825
47. H. Jones, W. Leghorn	4	823
48. Honnor and Forbes, R. C., W. Leghorn	46	822
49. A. Snell, *Brown Leghorn	0	820
50. C. R. Roberts, *W. Leghorn	32	820
51. E. A. Newton, W. Leghorn	13	816
52. J. White, Brown Leghorn	0	798
53. Mrs. McGree, W. Wyandotte	52	789
54. F. Mason, W. Leghorn	18	773
55. A. Coombs, S. Wyandotte	13	770

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* Male birds were placed in these pens on August 1.

FOWLS—*continued.*

Owner and Breed.	May.	Total for eleven months.
56. Jas. Kirk, G. Wyandotte	56	749
57. J. S. Miller, S. Wyandotte	35	748
58. Ericville Egg Farm, *Black Orpington	0	739
59. H. H. Wegg, G. Wyandotte	34	714
60. C. Crawley, B. Orpington	0	705
61. J. E. Redman, S. Wyandotte	24	694
62. J. B. Pettit, S. Wyandotte	61	686
63. H. M. Kelly, *B. Orpington	2	675
64. A. Savage, Minorca	1	632
Total	2,305	60,089

DUCKS.

Four in each Pen.

Owner and Breed.	May.	Total for eleven months.
1. R. A. Dusting, *Indian Runner	58	1,010
2. Adelaide Poultry Yard, Indian Runner	59	866
3. D. F. Vincent, *Indian Runner	37	855
4. Austin and Thomas, *Indian Runner	20	836
5. Ericville Egg Farm, *Buff Orpington	85	828
6. Bon Accord, *Buff Orpington	75	807
7. F. T. Rowe, Indian Runner	76	798
8. Miss E. Parker, Indian Runner	37	766
9. Aveley Poultry Yard, Indian Runner	42	754
10. E. A. Newton, Indian Runner	51	749
11. A. Snell, *Indian Runner	40	744
12. G. Stead, *Indian Runner	41	731
13. Perth Poultry Yard, *Buff Orpington	77	727
14. S. Craig, Indian Runner	58	724
15. C. W. Johnson, *Indian Runner	35	718
16. C. E. Close, Indian Runner	14	706
17. W. Snowden, *Buff Orpington	67	669
18. Mrs. Mellen, *Indian Runner	54	662
19. J. B. Pettit, Indian Runner	22	654
20. J. R. Parkes, Indian Runner	0	611
21. F. Piaggio, Buff Orpington	12	610
22. Sargenfri (S.A.), *Buff Orpington	45	565
Total	1,010	16,390

* Male birds were placed in these pens on August 1.

CULTIVATION OF ROSES.

By T. Church.

While the cultivation of flowers hardly comes within the scope of the *Journal*, it is thought that, with many of our settlers now coming to that stage when time might be found for some attention to be paid to the aesthetic side of life, a paper on the subject might well have room in its pages. While the busy husbandman might not be inclined to consider seriously the adornment of his grounds, it might be that the housewife or some members of the family may, and to them the subject of cultivation of roses will be of interest. As the rose is probably the hardiest, the easiest to cultivate, and the most profitable in providing bloom, it has been selected as the material for the subject under notice.

The cultivitation may be left to the women folk, and the providing of water, and manual work, to the generosity of the head of the house to the intent that—now being well supplied with the sinews of war for the battle of life, his flower garden may be typical of his labours—to make his selection "to blossom as the rose."

The following comprehensive paper upon the cultivation of roses was read by Mr. T. Church, of the National Bank, Perth, at the last meeting of the Horticultural Society of Western Australia. Mr. Church has made roses his special study for a number of years, and, as one of the most successful of growers under local conditions, the result of his experience, as given below, should prove valuable.

Roses.

What can I tell you about roses that is novel or new ? Nothing, I fear. The virtues and beauties of the rose have been descanted on in Holy Writ, and her praises sung by Homer and Sappho. She has been mentioned, too, as having her place in the famous gardens of Babylon, said to have existed 2,000 years before the Christian Era. The rose is consequently of high antiquity. In Ecclesiastics we find, "Hearken unto Me, ye holy children, and bud forth as a rose growing by the brook of the fields." The Greeks esteemed it, and used it on occasions of public rejoicings in their religious ceremonies, and the youth of both sexes wore them in the fêtes. The white rose stood with them as the symbol of friendship ; the presence of the flower, as Thomas Miller's poetical language of flowers puts it, being "to prevent the malign whisper—to freeze up slander's hateful slime—and destroy that venom which, once circulated, proves so fatal to human happiness," The Romans used the rose, or rather debased it, by decorating with it their bodies and tables at their feasts to Bacchus, believing that it preserved them from drunkenness during their costly revels.

It is found nearly all over the earth, almost every country having some indigenous form of it. Australia is an exception, for we have no native roses. It is supposed to have come from the East, for Persia and Palestine were famous for their roses. In form it differed from the rose of our present day, and its evolution to the number of the many divisions in which it is now described cannot be exactly followed. If, therefore, I can tell you nothing new about roses, it is left to me to humbly give you my practical experiences as an amateur, and to direct you to those places where you may find the storehouses of knowledge. When Cobbett—nearly a hundred years ago—wrote his "English Gardener," he assumed his readers knew nothing of his subject, for he said—"By looking on the reader as knowing nothing at all about the matter, the author is led to tell all that he knows." So by adopting his method, I shall follow a good precedent.

If my small knowledge and experience as a grower in Perth may lead some of you to strike out for yourselves, and start the active business of amateur rose-growing, the purposes of this modest paper will be fully served and rewarded. The improvement by cultivation and hybridising has been so great of recent years, that practically the whole of the roses grown 20 years ago have been discarded and replaced by modern specimens.

Can we grow roses in Perth? Yes, we can. In our splendid climate, with proper cultivation, we can produce blooms in abundance, equal, I believe, to those grown in any part of the world. Let us get down to a practical basis, and consider for what purpose your roses are needed. We want them for table decoration, to adorn our persons, and to decorate our gardens. Therefore, we want ever-blooming roses, or roses that will bloom nine months out of twelve. The great William Paul has divided the rose world into 41 divisions. We need only consider four of them, as suitable to our climate, and, therefore, the most profitable :—

(1.) The Hybrid Perpetual, or the Rose of England.
(2.) The Hybrid Tea, and its Climbing Sports.
(3.) The Tea Scented.
(4.) The Noisette.

The first-mentioned, Hybrid Perpetual, will be know by its long shoots and erect habit of growth. It blooms in the Spring only, as a rule, but occasionally in the Autumn. Our climate is rather too forcing for it, and, consequently, the flowers suffer at the expense of its vigorous growth. In this division will be found the dark colours and the strong rose scent, but it should not be largely grown if constant bloom is desired. In form, it is very large and double, but with one or two exceptions it need not be generally considered as a rose to grow extensively in Perth gardens. Frau Karl Druschki, Ulrich Brunner, and Paul Neyron, might be used as those exceptions. The second and third divisions contain nearly all the roses that need engage our attention. The Hybrid Tea is mainly constituted by the results of crossing the Hybrid Perpetual with the Tea. In appearance, these groups are much alike. It is difficult to detect any difference. These roses will bloom nearly all the year. They do not have, perhaps, amongst them the fine dark colours or the strong scents of the Hybrid Perpetuals, but they supplant them for delicacy of colour and varity of form. Further, as nearly all dark colours "burn" and blacken in our sunshine, this defect is, perhaps, of no importance in considering the respective merits. The last division comprises those beautiful climbers, Lamarque, Cloth of Gold, Marechal Niel, W. A. Richardson, and many others. They bloom all the year, and when the proper situation is found for them, grow to a great size. Lamarque is the oldest Noisette. It was raised in 1830, by a shoemaker at

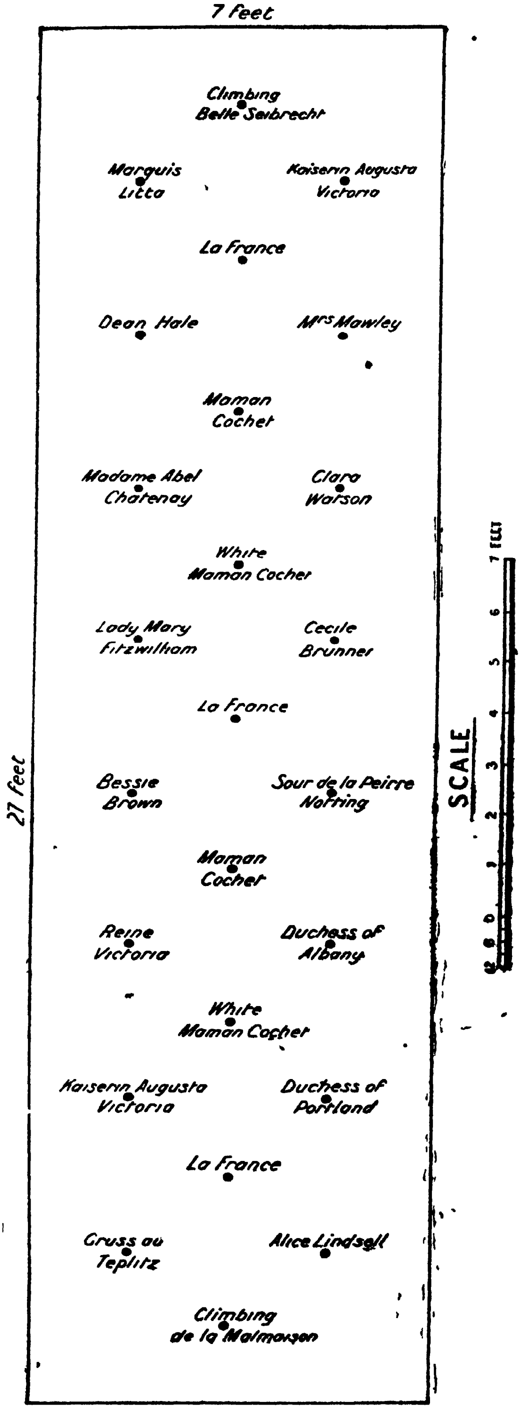
Angers, in his window garden, and is believed to be the seed parent of Cloth of Gold and Marechal Niel. Of this division only Cloth of Gold and Marechal Niel need be considered in our choice of free bloomers and hardy roses. Our summer sun, in my experience, is too hot for W. A. Richardson. Lamarque can be grown where a big wall or trellis can be given it, for it is a rampant grower. Of these four divisions, therefore, we have to look to the Teas and Hybrid Teas mainly to fill our gardens.

Having found the roses that will suit us we will next proceed to sort out the best of them, and consider how to grow them. Will roses grow in sand—or rather will they bloom in sand ? No ; they will not. They will languish and eke out a miserable existence in it ; but if any of you wish to make an initial attempt at rose-growing in sand, give up the idea. Stick to your carnations or annuals, and leave roses alone. Nature moulds everything according to its environment, and a sand-grown rose partakes of the surroundings of its foster-mother. A La France rose grown in sand will, after a year or so, if it survives that time, reward you with a spasmodic bloom of a decidedly sandy colour. The rose requires :—

(1.) Greasy loam, or a fairly stiff clay soil.
(2.) An open position in the fine sunshine.
(3.) Water in the summer.
(4.) Cattle manure, well decayed, dug in lightly every Spring.

There is no royal road to successful rose growing. Their requirements are simple, but Nature must be honestly dealt with, or she will be fickle in her reward. If you take rose growing seriously you must drop conventional ideas, and, as Dean Hole puts it, be prepared to "revel in refuse and dance with delight on your dunghill."

But your garden plot is all sand, and you must have loam or clay before you can start operations. I must tell you where to get it, and how to use it. The great English amateur grower, Foster-Melliar, whose work on amateur rose growing is, I think, the best on the subject, in illustrating what kind of soil was best for roses, said that once when at a friend's house to dinner he was served with some rich plum pudding. Seeing him steadily looking at the mixture for some time the host asked what was wrong with it. "Oh, nothing," said Melliar, "but I was thinking what fine stuff it would be to grow roses in." That illustration will serve our purpose. I have here some samples of soil I have found suited for rose requirements. The red soil along the Darling Ranges is very good, and it can now be had very cheaply. It is now being retailed as an experiment by the Imperial Firewood Co., next to the East Perth Station, at a shilling or two a sack, or it may be had by the truckload from the Hoffman Brick Company, and others, for about £2 5s. for five tons, delivered within a mile of Perth Station, made up as follows :—Truck of soil, 20s. ; freight, 11s. ; cartage from station, say, 12s. to 14s. How many roses do you want to grow ? Start moderately with, say, six. Take out the sand and make a hole two feet square by about 18 inches deep. Three bags of soil would suffice to fill these holes. Mix some well-rotted manure with it—two or three spadefuls to each hole, and the same of sand—and fill in the holes. If you do not have any old manure don't mix any other with the clay, except a handful of bonedust. Mulch the top instead with new manure if you have



no old. See that the position for your roses is in the open. Roses like the sunshine and fresh air, and don't want coddling. In August order your roses and plant them, first pruning the roots in the way I will now show you. Having planted them with the roots about six inches below the surface, prune the bush back to two or three shoots, leaving about three buds, or about six inches of wood only. I recommend you to plant as your six the following :—La France, Maman Cochet, White Maman Cochet, Climbing Belle Seibrecht, Kaiserin Augusta Victoria, and Clara Watson.

The accompanying diagram will be found a good one to follow where room will permit, in fact two, three, or even four of these beds will prove most pleasing to the eye. Considerable care has been taken to give the best possible effect, and add considerably to the beauty of the garden.

The Climbing Belle Seibrecht will make a fine pillar rose. A stake (jarrah 2in. x 2in. preferred) about 7ft. out of the ground, will be most suitable. All of these roses may be grown on their own roots. If you want to outshine your neighbour and get better display for the bushes then get half-standard roses, *i.e.*, roses budded on the Adelaide Briar stock —only give them larger clay holes. To those of you who are more ambitious I would recommend the formation of a real rose bed, and I have made a plan to contain, say, 24 roses on the lines laid down by Foster-Melliar. It is an oblong in shape, 27 feet long by 7 feet wide, and the roses will be about three feet apart in rows. The roses to form the bed are as follows :—First row, K.A. Victoria, Mrs. Mawley, Clara Watson, Cecile Brunner, Souv. de la Pierre Notting, Duchess of Albany, Duchess of Portland, Alice Lindsell ; middle row, Climbing Belle Siebrecht, La France, Maman Cochet, White Maman Cochet, La France, Maman Cochet, White Maman Cochet, La France, Climbing Souv. de la Malmaison ; third row, Marquis Litta, Dean Hole, Madam Abel Chatenay, Lady Mary Fitzwilliam, Bessie Brown, Reine Victoria, K.A. Victoria, Gruss au Teplitz. To form the bed you will need a truckload of clay—five tons—and you can either make the holes as already described, or take out the sand altogether for a depth of 15 inches, mix the clay with about half a load of manure and a barrow load or two of sand, and fill in the bed. Jarrah kerbing, 6 by 1, makes a permanent border—keep it two inches above the ground. Having pruned the roots, plant the roses and prune the heads. If you plant in August you will have a few blooms by January, and in April and May the growth of the bushes and the number of blooms will surprise and delight you. Don't plant anything else in your rose beds. The Queen of Flowers will not tolerate the presence of plebeian neighbours amongst her royal subjects. For that reason do not place your rose bed in the neighbourhood of trees or large shrubs. Do not choose a shady spot for your roses. Place them where they get the sunshine all day long. The sudden change from spring to hot summer may disconcert them at first, and take the substance and colour out of the blooms, but they quickly adapt themselves to the altered conditions, and by the time autumn arrives, the rose in its full splendour will reward you.

Prune your bushes in August. We are told by Paul that our forefathers learned the benefit of pruning, and conceived its usefulness in Nature from the vigour and beauty of some plants on which goats had been browsing. Pruning is the most useful and most difficult thing in good rose culture. Amateurs usually do not prune back hard enough. The object of pruning is to shape your bush, and to induce new growth of wood. The stronger the plant the less you prune, the smaller the growth the more you cut back. Prune out your shoots to three or four, and in the case of dwarf plants cut these shoots back to from 6in. to 10in. from the ground. Prune Hybrid Perpetuals harder back than Teas or Hybrid Teas, and with pillar or climbing roses select three or four shoots of new growth, and cut away about one-fourth their length, removing all spindly growth, and cutting your laterals back to one or two buds. Try and look around Mr. Braithwaite's garden when he is pruning his roses, and read Melliar and Paul on the subject. A friend of mine once told me that when he felt elated at anything that seemed good, or his active and able mind sometimes gave him cause to think, his intellect was of no mean order, he took down a book on pruning, and this brought him back to earth at once. Pruning certainly teaches humility. I know of no subject so difficult to understand as the art of pruning explained in a book.

The Life of Rose Bushes.

In England it is the custom to grow nearly all roses on one stock or another. The seeding briar, the dog rose, and the manetti stocks are commonly used. In this paper I have recommended growing them on their own roots as a general practice. The reason is that I have, as yet, failed to find a stock that will comply with the exacting nature of our long summer. The briar is still on its trial. These briars come from Adelaide, but how many years service they will give has yet to be proved. The Sydney growers use the Noisette stock largely. I have it largely planted in my garden, but experience has decided me to root it out this year. Probably no stock will long survive our hot-house climate. In colder climates the roses rest in the winter—the roots sleep and awaken in the spring ready to commence their labours. Here the bush gets practically no rest. My roses bloomed last year well into August—pruning being carried on even while some were in the bud. Cuttings planted in August last are now big bushes in full bloom. Our winter gives no rest, it is too mild. Accordingly, I advocate the growing of those kinds which do well on their own roots, and every fourth year rooting them out, and replacing them from the nursery bed stocked with rooted cuttings.

If some gardener offers you a fine large rose bush that he has dug out "because he has to make room for newer roses, or he cannot give it the room this year in his garden," take it with thanks and plant it in your dust bin. You will be saved much time and vexation. We are taught not to look a gift-horse in the mouth. Chas. Lamb says that this is a popular fallacy, and that when someone passed his spavined old horse to him, without mentioning his defects "he would be no more cheated out of his thanks than out of his money." Remember that the finest blooms are usually produced on the first-year bush. These remarks do not apply to the climbers. They do not come into bloom until the second year, and, consequently, their lives are longer. Marechal Niel and Cloth of Gold will produce good blooms for many years, and grow to a great size.

Propagation.

As indicated, own root roses are mainly recommended in this paper. Propagation will therefore mainly be carried on from cuttings. These can be taken at any time during the year when your plants can spare them. I find, however, that cuttings taken in late May, June, or July, not worth troubling about. The ground is cold and if the soil be very wet they will rot off. Take cuttings from the season's wood, fairly ripened, not old hard shoots of the previous year's growth. Cut to a heel, *i.e.*, with the junction, or part of it, where another shoot joins it. Take them from four to eight inches long, leave two or four leaves on the top, and plant in a slanting position six to eight inches apart in the rows to a depth, leaving about two inches out of the ground, in a light soil to which no manure has been recently added. Properly taken and planted fully ninety per cent. will strike. In three weeks a callus is formed, and then tiny roots form. Leave them to grow at will until the following spring and then plant out. If taken in November to, say, January, you can lift them in April. If planted in August leave them until mid-autumn, or spring. I have lifted and transplanted cuttings when hard pressed as soon as I have found the callus and tiny roots formed—within two months of taking the cuttings—but I do not recommend the practice as one to be generally followed.

I must emphasise the danger of exposing the roots of any rose to the action of wind or sunshine. An hour's exposure of the roots to either will do great harm, and probably prevent your bush flowering for many months. I have not dealt with the raising of roses from seed gathered from the rose heps or by budding. These matters, and many other aspects of rose culture may be the subject of a further paper, if the interest in the subject demands it.

Enemies of the Rose.

The two chief enemies are the aphis and mildew. The first will be known so quickly that it does not need description. The aphis brush, costing 2s., will be found effective and quick. Another common remedy is the solution of quassia chips, and whale oil soap. Boil four ounces of chips for a few minutes in a gallon of water, strain, and add whilst hot a handful of whale oil soap. Soft soap will do if the first-named is not procurable, make up with water to about three gallons. Spray the infected parts in the evening, and wash off with pure water in the early morning. The common spray-pump with the barrel or tank at the end I find most effective.

Mildew is a fungus growth, and the most serious of all pests. It will be known by the curl of the leaf followed by a powdery white scum deposited along the young shoots, and on the leaves. Dust with sulphur, after first spraying with water, or in the early morning, or late evening when the leaves are moist. Cut off and burn badly infected parts. Mildew generally comes at the change of season, and is more prevalent when bushes are grown in a position not fully in the sunshine. It must be attended to at once for the spores are carried by the wind, and will affect other bushes. Mildew to the rose may be likened to the effect in man of a chill or cold caught by exposure to a suddenly cooled atmosphere. Sulphur is a sure preventative. I find the French lever bellows the best for general use.

Thrip.—Small black hopping insects, usually bad in the spring. They nibble the petals and spoil and discolour the buds. Nature of the season seems to affect them. A dry spell usually brings them. I know of no means of extermination that is wholly effective. Moisture will keep them off, so spray the bushes with water if the season is dry.

Red Rust.—Its name will be the means of identification. It is not very serious except that, as it affects the leaves, it interferes with the breathing of the plant as asthma does with humans; growth is thereby retarded. Dusting with sulphur, I believe, does good.

Red Spider.—You will not find the spider with the naked eye, it is too small. Small red dots on the under side of the leaf, and general discolouration will tell you it has arrived. Moisture, as with thrip, will retard it, and I find dusting with sulphur effective.

Mealy Bug, Red Scale.—These have lately, in my experience, established themselves on roses. Their names will identify them if you have them. I have found the quassia chips and soap emulsion effective. Kerosene emulsion, as given by Mr. Despeissis' handbook is also good, and probably more effective.

Caterpillars.—Of various kinds, from green to brown—the progeny of various moths, are sometimes numerous. Hand-picking I have found to be the only remedy. Examine your rosebuds just before they burst, at night time, with a lantern, and pick off and destroy the intruders.

Carpenter or Upholsterer Bee.—The bee will be known by the circular pieces he cuts out of your tender young leaves with which he lines his nest in some adjacent log or stump. He is about the size and colour of a drone black bee, somewhat larger. Catching him with a net or tracking him when laden with your leaf to his nest, and there destroying the colony, is the only remedy suggested. His depredation retards growth of the bush, and makes the shoot unsightly, but otherwise is not serious.

Regarding aphis, mildew, red rust, red spider, and scale, I find prevention the surest means of coping with them. Keep your plants healthy by good cultivation, root out sickly or weakly plants, and you will have little trouble. A strong vigorous plant, as with a healthy human, will not be much troubled with ailments.

The Craze for New Roses.

If we always held on to old favourites and ignored the newcomers, we should have approached that age at which we enter fossildom. As I have already pointed out, the character of the rose has completely altered during the last 20 years, and old growers agree that, taken as a whole, the alteraion has been for the advancement in size, colour, form, and free blooming qualities. The note of discontent I have to sound is the craze for new roses. Each year adds 20 or 30 novelties to a long list of the grower's catalogue, and how many of them deserve the extravagant descriptions given them? I will read you one or two, with my own experience of them after a year or two's trial. There is something in human nature that makes us always desire something novel—a newer house without the comforts of the old—a new pill or nostrum, generally an old one in a new name and wrapping, or a new style of lady's footwear, with heels as lofty only as the spirit of endurance that enables the wearer to use them. You must have them, and in rose-growing we follow that fashion. I can safely say from looking over the lists for a few years back that not 25 per cent. of these wonderful new creations in the rose world survive. Therefore, unless you are very enthusiastic, and are prepared to turn over your bushel of chaff and get your grain of wheat, leave the new roses to be tried by the big growers or the public gardeners (who must have them); wait a year or two to see them proved, and then buy them if they survive. New roses will cost you 3s. 6d. to 5s. each—you can get proved favourites for 1s. or 1s. 6d.

Colours of the Rose.

I may add a few notes on the colours of the rose. Except in the Hybrid Perpetuals, we have scarcely any very dark colours in the Teas or Hybrid Teas. There are two or three—Liberty, Etoille de France, and Francois Dubreuil, are, perhaps, the darkest; but these suffer badly from the strong sun. In pinks, the Teas and their Hybrids provide all shades, from the deep pink of Belle Seibrecht, to the delicate shades of Maman Cochet. White is plentiful. We have White Maman Cochet, K.A. Victoria, Niphetos, and many others. Frau Karl Druschki is the grandest white we have, but our climate does not suit its general cultivation, and my experience is that in the early spring you get some fine blooms ; in the summer it is a semi-double ; and in autumn it may not bloom at all. In my opinion it is lacking in substance ; once beyond the half-brown state it is gone, and its English reputation does not uphold it in this climate.

Yellows are not plentiful. The strong summer sunlight makes Marechal Niel red on the outer petals, and Cloth of Gold creamy at the edges. If we can grow either of these well, however, we need not trouble about others, for their colours are true in spring and autumn. Perle des Jardins is good, but usually of bad form. A dwarf yellow with erect stems would be a great addition to our rose world, for Marechal Niel, aware of his pre-eminence amongst the yellows, modestly hangs his head, and has to be wired up to show his beauty. The blue rose is not yet. When our scientific friends solve the problem of light that will give them the direct colour photograph, we may look for the blue rose.

Literature of the Rose.

It would not be possible to include the poets who have contributed to the worship of the rose. Their number is legion. Our silent friends to whom we may, with advantage, turn our march for instruction, may be limited to three or four. First—the great authority Wm. Paul, "The Rose Garden," price about 10s. Dean Hole, "A Book about Roses," 3s. 6d. Foster-Melliar, "The Book of the Rose," 6s. Every amateur should have these books, or at least one of them. Dean Hole's great work in the rose world was in 1858 to found the National Rose Society, and through that society and his enthusiasm to spread the great interest and active participation of many thousands in rose-growing. Melliar was, perhaps, the most practical amateur grower in England, and his book is ahead of all others as a handbook for the instruction of amateurs. I have also drawn on the experience of a true friend and veteran rose-grower, Mr. Daniel Sewell, at one time my neighbour—who exhibited at the Crystal Palace back in the seventies, and whose fame as a rose grower was the pride of his country town in England for a generation. It was he who, when he came to Western Australia a few years ago, in his sandy garden, "was to make the wilderness be glad, and the desert to bloom as a rose." He started me rose growing, and thereby did me a service. If this paper will induce some of you to follow the example, my debt to him will have been discharged.

IMPORTATION OF FOODSTUFFS.

The Hon. Minister for Agriculture (Mr. James Mitchell) has sent a circular letter to the principal agricultural societies throughout the State, inviting them to confer with him in August on a question which has always been of vital interest to the State. His aim is to bring about a reduction in the importation of foodstuffs, and he hopes, with the co-operation of the farmers, to succeed. The interesting communication that has been written to the societies, together with a table attached showing the magnitude of the imports is given below :—

"Sir,—When I had the pleasure of meeting the representatives of the various agricultural societies of the State during the Conference on 25th March last, I extended an invitation to them to meet me in July for the purpose of discussing matters of interest to agriculturists generally.

"I now beg to notify you that I have decided upon Wednesday, 14th August next, for the Conference to meet at the Lecture Room of the Department of Agriculture at noon.

"It seems to me that the question of the importation of foodstuffs should form the basis of our Conference. A list of farm and dairy imports into this State during 1906 is enclosed.

"I shall be glad if your society will give consideration to the various items appearing on the list that might well be raised in your district. We could then confer as to the best means of bringing about the development of the various industries for which your locality is fitted. It would also be of advantage if you considered any other item of interest to your district, and to the State generally.

"If you could advise me by the middle of July of the conclusions you have arrived at, an agenda paper could be prepared and despatched to your society.

"You will see from the list of imports that we send out of the State some £2,095,992 for farm, dairy, and agricultural produce. Whilst I think we might well set out with the idea of curtailing these importations, we should also consider the question of ourselves becoming exporters.

"Our wheat-growers and orchardists have now to seek a market overseas, and I am very hopeful that we shall, in the near future, export other articles of local produce.

"Whilst Western Australia, with a population of 262,000, and a total area of 624,558,800 acres, finds it necessary to import foodstuffs for her people, South Australia, with a population of 375,000, and a total of 578,361,600 acres, exported in 1905-6 18,000,000 bushels of wheat, 39,500,000 pounds of wool, and in the first half of the year 1905 13,912 carcases of lamb.

"When it is remembered that each State of the Commonwealth will repeat her exports every year to an increased extent, and that the London market is practically limitless, we must realise that the question of turning our lands to the fullest account is of serious consequence to this State.

"In asking you to meet and confer with me on Wednesday, 14th August next, at noon, I am actuated first by the necessity that we must produce sufficiently for ourselves, and secondly that we must develop our export trade.

"I shall be glad if you will appoint two representatives from your district, and furnish me with the names, when I shall be pleased to forward the necessary railway pass.—Yours faithfully,

JAMES MITCHELL."

1906 IMPORTS.

List of certain farm and dairy products imported into Western Australia, which the State is herself capable of raising :—

	Australian origin.	Total imports.
Ale and beer	11,363	82,862
Animals (living)—		
Horses	54,519	55,129
Cattle	54,989	59,749
Sheep	97,003	98,481
Pigs	395	395
Other	2,486	3,678
Total	..	214,434
Biscuits	15,077	17,302
Butter	340,356	340,516
Candles	2,542	3,132
Cheese	37,758	31,241
Eggs	63,495	64,776
Fruits (dried)—		
Currants	58	6,195
Raisins	5,296	7,130
Other	2,653	4,732
Total	..	18,057
Fruits (fresh)—		
Apples	8,615	9,949
Bananas	8,941	9,892
Oranges and lemons	4,122	12,888
Other	3,254	3,520
Total	..	36,249
Grain—		
Barley	3,959	3,705
Beans and peas	1,933	2,712
Maize	2,212	2,223
Oats	70,550	87,552
Wheat	5,034	5,046
Other unprepared	432	876
Bran, pollard, and sharps	72,761	73,426
Flour	43,536	47,949
Malt	26,325	52,212
Oatmeal	13,663	16,018
Other (prepared)	6,754	10,335
Total	..	302,054

IMPORTS—*continued.*

	Australian origin.	Total imports
Hay and chaff	20,243	20,257
Honey	1,479	1,479
Hops	9,976	19,999
Jam and jelly	59,491	62,337
Leather	29,880	34,727
Linseed	49	472
Linseed cake and oil-cake	3,652	4,354
Meats—		
Bacon, ham	122,253	122,819
Preserved, cold process—		
Beef	2,797	2,797
Mutton and lamb	44,158	44,160
Pork	3,300	3,300
Poultry	3,713	3,724
Rabbits and hares	1,934	1,934
Other	598	598
Preserved in tins	71,365	81,962
Total	..	261,294
Milk—		
Concentrated	6,709	9,356
Preserved	13,023	87,975
Total	..	97,331
Onions	14,763	15,491
Pickles, sauces	10,641	25,533
Potatoes	98,108	99,242
Soap	19,490	27,690
Spirits—		
Brandy and whisky	3,574	116,820
Stearine	18,720	18,720
Tallow	195	195
Tobacco—		
Manufactured	68,022	83,422
Unmanufactured	..	1,321
Cigars	3,336	17,440
Cigarettes	20,823	37,168
Total	..	139,351
Wine—		
Sparkling and other	21,735	40,117
Grand Total	..	2,095,992

LESPEDEZA STRIATA.

JAPAN CLOVER

OF INTEREST TO DAIRYMEN.

To the Editor.

Dear Sir,—Having made a special study of fodder plants for the past few years, and knowing their great importance to our stock-breeders and dairy farmers, I would deem it a very great favour if you would publish the following, as it may prove of immense benefit to those who peruse it carefully. Now that the dairying industry is making such rapid strides, and is even extending to the semi-arid areas of our States, where this avocation would not have been thought of a few years ago, the publication of subjects like the present should help our settlers incalculably. We all know what the famous paspalum grass has accomplished for the North Coast ; how it has doubled and trebled the carrying capacity, and increased, to an almost fabulous extent, the value of all property ; promoted settlement by leaps and bounds ; placed our farmers in good, if not independent positions, and made a world-famous name for the Northern River Districts ; and I most sincerely trust that our settlers here and elsewhere may be enabled to obtain much benefit through the cultivation of *Lespedeza,* which appears to be most eminently adapted to the requirements of the dairy farmer. Dr. D. L. Phares, of the Agricultural and M. College, Miss., U.S.A., gives the following most interesting account of it :—

" To botanists this plant has been known for generations in its native habitat in China, and other Eastern parts of Asia. Finding its way to Japan it encountered congenial climate and soil, and rapidly spread over the entire country, occupying all waste places, which it has continued to possess and improve for much more than a century. Here, as on the Continent, it was of dwarfish habit, and received a name indicative of the fact.

Finally, a few seeds, arriving in the United States, germinated, contesting a few feet of soil with other native and exotic plants that had long preoccupied the land.

It gained strength, and increased in yield of seed till, becoming somewhat abundant, it commenced its Westward invasion, simultaneously extending its conquest Northward and Southward, firmly holding all conquered territory. Since 1870, its strides Westward have been immense. It now extends from the Atlantic seaboard across the Mississippi, and its outposts are pushed far towards the Western border of Texas.

Denuded, soilless hilltops, sandy plains, gravelly slopes, bottoms and banks of washes and gullies, pine thickets, open woods, fields, dry and damp soils, all seem as if specially created for its home. It seizes upon all with equal facility.

It maintains its dwarfish habit on sands, gravels, and other spots too poor to produce any other vegetation, densely covering the surface with its green robe, and affording delighted live stock with delicious, nutritious grazing for four to eight months of the year. But on richer soil it doffs the dwarf and dons the tree style, justifying the American name of bush clover ; sending its long tap-roots deep down in the sub-soil, and its stem two or three feet up into the light and air, with its many branches thickly set with leaves, inviting tooth and blade.

It attains here on rich or medium soil, protected from live stock, a magnitude that could not have been imagined by one seeing it in its far Eastern home. It has, no doubt, been much improved by introduction into this country. It takes possession not only of unoccupied land and pine thickets, but grows among sedges, grasses, briars, and weeds, completely eradicating many species of noxious grasses and weeds. It subdues even broom grass, and holds equal contest with Bermuda grass ; in some localities one yielding, in other localities the other succumbing, while in other spots both maintain equal possession ; or one year one may be seen to rule, and the next year the other.

On sands, gravels, or denuded clay hilltops, no other plant known to me is so valuable for grazing. Taking a succession of ten years, the same assertion would not be far out of the way for rich lands, while few forage plants on these would yield as much, or more, valuable hay.

The analysis of Red Clover gives 16 per cent. albuminoids and 41 carbo-hydrates. The average of the analyses of Japan Clover is 15.85 albuminoids and 56 carbo-hydrates, placing it above Red Clover in nutritive value. It is superior to other forage plants in several important particulars not generally observed by the careless stockman. (1.) The growing plant contains less moisture than any other valuable forage plant, with, perhaps, a single exception. Hence we never hear of animals being hoven, or bloat, or scours from eating this plant as when they have free access to Red Clover, peas, and many grasses. (2.) We have never yet found on the Japan Clover any fungus growths which are so common on other plants, as to cause many deaths annually among animals grazing on them, or fed with the hay. (3.) Heavy grazing for a few weeks destroys the clovers, lucerne, and most of the grasses, while this plant may be grazed however closely, whether the season be wet, or prolonged drought prevails, without damage. (4.) There is less difficulty in obtaining a catch with this plant than with most others. The seed may be scattered on bare, poor, barren ground, or on small grain sown the previous autumn or winter, and a catch will be obtained. (5.) The grain being harvested when ripe does not injure the *Lespedeza*. (6.) It is more easily cured than the clovers, pea-vines, and many grasses. (7.) It does not lose the foliage in curing as do clovers, peas, and some other plants. It furnishes good grazing.

On medium to good land, it ranges from one to three tons per acre ; and this may be obtained after having, during the summer, harvested from the same land a good crop of grain and straw.

Some of our farmers who have been mowing *Lespedeza* for five to ten years, regard it as the soundest, best, most wholesome and palatable hay they have used. These mowings have ranged from two to three hundred tons on single farms in one season. Yet no complaint as to quality, or relish of animal for it, or as to its nutritive value, or ill effect on the stock, has ever reached us. Those who have used it longest and in largest quantities and kept animals—cattle, sheep, horses, and mules—in best condition commend it most.

A measured half-bushel of seed per acre may be sown broadcast the first week in March (in spring and autumn in Australia) South of the parallel 32 degrees of latitude, a few days later as we proceed Northward for each degree or two. Sown in the fall of winter it springs up, but freezes often throw it out and destroy it. As already stated, it germinates and grows well on land in any condition, if the surface is not so loose as to let the seed sink too deep. When land has been prepared for, or sown in grain, the winter rains put it in about the best condition for growing this plant for heavy crops of hay.

The only complete proof of the value of a forage plant is found in the concurrence of chemical analysis, and the observation and experience of the stockman. When the relish of an animal for the forage is keen, the health preserved and improved, growth promoted, a maximum quantity of excellent beef, or mutton, or pork, and if superior milk and butter are obtained, we certainly have an admirable food plant. The judgment of the cow, the convictions of the farmer, arising from his experiences, independent of, and indeed in utter ignorance of any chemical analysis, confirming the decisions of the chemist give us the best of all evidences of the value of forage. And all these we have in this case. Japan Clover is also a great ameliorator and fertilisator. Its abundant long tap-roots decaying render the soil porous, and leave in it much nitrogenous material and humus. It releases and brings up from the sub-soil valuable plant food ; the ashes containing nearly 40 per cent. potash, 29.60 oxide lime, 7.82 sulphuric acid, 7.54 phosphoric acid—all most valuable elements in plant life and growth. Soils are thus renovated, slopes prevented from washing, gullies filled, moisture solicited and retained, atmospheric fertilisers gathered and garnered ; bald, barren wastes covered with living green to fill the stomach, delight the eyes, and cheer the heart.

It should have been stated that this plant has eradicated, over large areas in the Southern States, the much detested helenium or bitter weed, which so often damages the flavour of the milk of cows eating or while grazing. It is believed that it exterminates also two or three plants that are fatally poisonous to cattle and horses.

Comparative Analysis of nutritive matter in Blue Grass Hay, 48 per cent. ; Timothy Hay, 48½ per cent. ; Vetches Hay, 49 per cent. ; Pea Hay, 51 per cent. ; Orchard Grass Hay, 52 per cent. ; Red Clover, 57 per cent. ; Japan Clover (*Lespedeza Striata*) Hay, 71.85 per cent.

The Hon. J. C. Lee, Commissioner of Agriculture, Louisiana, says : "In North and Middle La, and even upon the pine hills and flats of East Louisiana, *Lespedeza Striata* (Japan Clover) covers every available space of unoccupied ground, even in the forest, affording excellent grazing throughout the summer for stock. When cultivated, particularly upon the bluff land of the State, it makes large crops of a very palatable hay, and many thousands of acres are now annually grown."

Professor W. R. Dodson, of the Louisiana Experiment Station, U.S.A., also writes : "Farmers about Baton Rouge are raising from two to three tons of *Lespedeza* to the acre, and it compares very favourably in chemical composition with any of the leguminous plants. A ton of clover hay contains about 206lbs. of protein, and 760lbs. of nitrogen free extract. A ton of cow-pea vine hay contains 332lbs. protein, and 884lbs. of nitrogen. To each acre producing two tons, the crop of cow-peas gives 252lbs. protein, and 168·nitrogen, more than the clover. *Lespedeza* gives an analysis nearly the same as the cow-pea, except being a little heavier in nitrogen."

To understand and properly appreciate the value of *Lespedeza* and its great fertilising power as a nitrogenous plant, I may be pardoned for quoting the following statement by Professor Wm. C. Stubbs, Director of the Louisiana Experiment Station, who says : "It is impossible to make successful pasturages from large grass crops upon poor lands until their fertility has been restored. Nitrogen, the chief ingredient, required by all grass crops, is the costly constituent of all commercial fertilisers, and is the valuable element in stable and home-made manures. Fortunately, Nature has provided for us a way by which we can store up this element in our soils at a merely nominal cost by the cultivation of leguminous crops, which from time immemorial have been used as renovators of soil. This family is a large one, and they all have nodules on their roots, filled with microbes, which, while they draw much of their support from the plants upon which they live, yet supply themselves with nitrogen drawn directly from the air. Having only an ephemeral existence, they are rapidly absorbed at death by the host plant, which utilises not only the plant food which these microbes have taken from the plant during their short existence, but also the nitrogen which they have directly appropriated from the air. The microbes are simply purveyors for their hosts, of nitrogen, taking it from the great reservoir of Nature, the air (which contains four-fifths of its volume of free nitrogen), and ultimately transferring it to the plant with which it lives in symbrolic union. The agriculturist of to-day, even the most advanced in theory and practice, fails to appreciate in its fullest measure this wonderful providence of Nature, and a clear descrimination of its use. Only by the practice of planting leguminous crops can we hope to economically and profitably restore the nitrogenous matter to our soils, and, all things being equal, that crop which will produce the largest amount of nitrogen, obtained from the air in a given time, is the best crop to grow for fertilising purposes."

From the foregoing description of this famous plant, our farmers and landowners can form an idea of its great value, and it should prove most serviceable to those who, by continuous cropping with sugar-cane, potatoes, etc., have impoverished their land. To our wheat-growers in the semi-arid Western Districts, many of whom also dairy on a small scale, and where fallowing and manuring is the custom, it should especially prove a great boon.

On the Northern Rivers (N.S.W.), where there is good soil and a heavy rainfall, *Lespedeza* should produce two or three cuttings per annum, and these, if made into hay, should return a good profit, even if it realised the same price as lucerne, which generally brings about £3 5s. per ton, and the land on which it was grown would also be greatly renovated and enriched. With best wishes.

Yours faithfully,
B. HARRISON,

Burringbar, Tweed River, N.S.W., Australia.

SHIPMENT OF APPLES TO LONDON.

The following is taken from a letter received from Mr. C. H. Rason, the Agent General :—

"I have obtained, by the courtesy of Messrs. Yuill & Co., a report upon the shipment of apples per s.s. 'Orontes.' I send you a copy of the report herewith, from which it will be seen that the apples arrived in good condition generally, and compared favourably with the Tasmanian fruit by the same steamer. The best were the 'Jonathans,' some of which variety realised 18s. per case, which is equivalent, roughly, to 5½d. per pound wholesale.

"Your letter was the only intimation I received of this shipment having been made—the shippers, as in the case of the lambs, and the wheat, not having considered it worth while to advise the Agent General. The consequence in the case of these apples is that they did not pass through the hands of Messrs. Keeling & Hunt, the fruit brokers who, in the past, have done everything in their power to assist Western Australia in regard to shipments of fruit. This treatment is not very encouraging either to them or to me. I would point out that I went to considerable trouble in ascertaining and advising the best kinds to send, the date when the first shipment from the other States might be expected to arrive in England, and urged that Western Australia should try to forestall that date if only by a week, so as to have on the market the *first Australian apples of the season*—this in plenty of time to have been acted upon.

"I requested that this information should be made public. I do not know whether it ever was or not, but the only result has been a shipment from Western Australia of 125 cases *by the same steamer* as 15,000 cases from the other States.

"When growers in Western Australia have to find a market in London for large parcels they will perhaps regret that they paid so little regard in the early stages to the advice of those whose only desire was to serve them at this end."

The following is the report from Messrs. G. S. Yuill & Co., London :—

"*West Australian Fruit ex. s.s. 'Orontes.'*

"We are now in a position to give you a short report on this fruit.

"Whilst the shipment showed a trifle immature, the fruit was of excellent quality.

"Comparing the apples with those from Tasmania, we should certainly give preference to the West Australian, although we have heard doubts expressed as to whether they would keep as well.

"The best fruit of the whole parcel was undoubtedly the 'Jonathans,' which arrived showing splendid colour, the larger apples especially being very handsome, and realised up to 18s. per case, which is, roughly, 5½d. per pound wholesale. The 'Ribston' and 'Cox O.P.' were also good, but the former hardly showed enough colour to make fancy prices.

"We give you below a summary of prices realised, which we think must be considered satisfactory, and we are confident that with regular shipments top market prices will be always obtainable, particularly if growers keep to the most popular and best carrying varieties, such as 'Cleopatra,' 'Jonathan,' 'Rome Beauty,' 'Munroe Favourite,' etc., etc.

"We regret to say that the few cases of pears were not a success; they arrived in a practically useless condition, and we would suggest that shippers adopt the tray system of packing rather than the usual bushel case; but in any case the shipment of this delicate fruit is of necessity a risky business.

"'Jonathan.'—5 cases, price 18s.; 3 cases, price 17s. 6d.; 7 cases, price 17s.; 16 cases, price 15s. 6d.; 3 cases, price 15s.; 14 cases, price 14s.; 9 cases, price, 13s. 6d.; 9 cases, price 13s.; 2 cases, price 12s. 3d.; 5 cases, price 12s.; 7 cases, price 11s. 6d.; 11 cases, price 11s.; 1 case, price 7s. 6d. (slack); 1 case, price 6s. (slack).

"'Cleopatra.'—3 cases, price 15s. 6d.; 4 cases. price 14s.; 17 cases, price 13s.; 5 cases, price 12s. 6d.; 1 case, price 11s. 6d.; 5 cases, price 11s.; 2 cases, price 10s.; 1 case, price 9s.; 1 case, price 7s.

"'Dunn Seedling.'—5 cases, price 15s.; 2 cases, price 14s. 6d.; 4 cases, price 14s.; 3 cases, price 13s. 6d.; 2 cases, price 13s.; 20 cases, price 12s. 6d.; 3 cases, price 12s.; 1 case, price 11s. 6d.; 1 case, price 11s.

"'Ribston.'—4 cases, price 15s. 9d.; 7 cases, price 11s. 6d.; 2 cases, price 11s.; 1 case, price 9s. 6d.; 3 cases, price 6s. 6d. (small cases); 14 cases, price 6s. (small cases).

"'Adam's Pearmain.'—3 cases, price 14s. 6d.; 6 cases, price 11s. 6d.; 10 cases, price 11s.; 1 case, price 10s.

"'Cox O. Pippin.'—3 cases, price 15s. 6d.; 3 cases, price 11s. 6d.; 7 cases, price 6s. (small).

"'Alexander.'—4 cases, price 10s.

"'Golden Reinette.'—1 case, price 11s.; 1 case, price 6s. 9d.

"'Glory of England.'—1 case, price 4s. 6d."

The following is an acknowledgment from Mr. C. H. Rason of a further but small consignment of fruit sent to the Agent General:—

"I beg to state that the six cases of apples, and one case containing one dozen melons from Mr. Despeissis, arrived generally in good condition: eleven of the melons were quite sound, one only being bad through bruising.

"By means of this small consignment I have been able to obtain a good advertisement for Western Australia, as beside exhibiting purposes, I was enabled to secure the following:—

"The Prince and Princess of Wales graciously accepted some melons and apples, which were placed upon the table at Marlborough House at the banquet their Royal Highnesses gave to the Premiers attending the Colonial Conference, the Royal instructions being that the waiters were to inform the guests that the fruit was from Western Australia. I think this is the first occasion on which fruit from Western Australia has appeared on the Royal tables.

"I send you also copies of letters from the Lord Mayors of London, Liverpool, Manchester, and Birmingham, speaking in terms of praise of the samples sent them.

"The fruit has attracted considerable attention, and has been much admired.

"Cases Nos. 1, 3, and 4 were not very carefully packed. Case No. 2 was well packed."

BUILDING AND EQUIPPING OF BUTTER FACTORIES.

Now that so much is being done towards the development of the dairying industry, all information bearing on the subject should be read by those interested. The following able article on "Butter Factories" is taken from a report by Mr. J. A. Kinsella, Dairy Commissioner to the New Zealand Government:—

"The building and equipping of factories is a matter of extreme importance, and one which necessitates the giving of considerable information, both written and verbal, to those settlers in new dairying districts who contemplate starting factories. The following information, given as briefly as possible, is therefore warranted :—

There are two types of buildings used for butter factories, both of which have their advocates. The difference is that one is constructed with the floors of the separating, cream, and churning rooms at different levels, so that the cream may flow by gravitation from one stage of the process to another, while the other type has everything on one level.

When building a butter factory, where at all possible, a gravitation site should be selected. There are many strong points in favour of the gravita- is properly placed on the site, with the butter-making part of the factory properly placed on the site, with the butter-making part of the factory facing the south, that part escapes the hot summer sun—in other words, the butter-making room will be the coolest portion of the building. (2.) When the butter-making department is the lowest there is always a tendency for a current of air to go upwards, which prevents all bad odours from separators, engines, etc., passing into the cream-ripening and butter-making rooms. (3.) If the factory is properly arranged on the gravitation system, all elevating of milk and cream is done away with.

The Butter Factory.

A first-class butter factory should contain—(1), Receiving, pasteurising, and separating room ; (2), cream ripening-room ; (3), churning and butter-working room ; (4), chilling room for butter between workings ; (5), freezing chamber ; (6), testing room and office ; (7), boiler and engine-room ; (8), refrigerator room ; (9), store-room for boxes and paper ; (10), specially-constructed salt room with steam-heating coil.

The building should be of a substantial character, and sufficiently large to permit of the addition of extra plant when required. It should be so constructed that it could be enlarged or extended at any time under the one roof, without necessitating the building of small rookeries on to the sides or ends. All butter-working and cream-ripening rooms should be airy and well lighted and ventilated. All such rooms should have open cement drains, giving free access to the scrubbing brush. The base of the walls for at least 2½ft. above the floor-level should be either of concrete, or brick faced with concrete, or plaster and cement. The walls should be weather-boarded outside, lined with matched timber inside, and finished with a coat of light-coloured paint to prevent the wood from becoming musty. If paper is used in the building the plain kind should be procured ; tar-papers should never be used, as the odour is objectionable.

Equipment or Plant.

This is a matter of very considerable importance, and calls for a few words of general advice. Many mistakes have been made and much money lost by the installation of unsuitable or inefficient machinery and appliances ; and, although it is impossible for any Government department to name the best makers of machines, still, no exception can be taken to general specifications, and these may serve to guide directors of companies in making purchases.

It is very poor economy, indeed, when equipping a factory or creamery, to instal old or obsolete machinery because it is found cheapest. Yet we find this is being done in some places, and many factories are losing more money in one year through the use of of inefficient and defective machinery than would be required to equip them with up-to-date appliances.

Boilers and Engines.

The common error is to insert far too small a boiler, with the result that in two or three years, sometimes even sooner, a larger one has to be procured, and the old one sold at a sacrifice. It is poor economy to buy a small boiler, for, apart from prime cost, it is actually cheaper to have a large boiler. Steam can be more easily kept up in a large boiler, and the work is done at a lower pressure. It is very important to have the boiler-house detached from the butter factory. There should be a space of at least 3ft. between the main building and the boiler-house, so as to allow free circulation of air, and prevent the heat from the boiler passing through the butter rooms.

The engine should be of the horizontal type, and sufficiently powerful to drive all machinery without too much strain on it. If too small an engine is installed for the work required of it, it will soon become worn and rickety. The engine should also be fitted with a first-class delicate governor. The latter item is particularly important for the running of separators at a uniform speed.

A Word on Separators.

Separators should be of the most improved and up-to-date type, and capable of dealing with the milk quickly and efficiently. The skim-milk should not contain more than 0.05 of 1 per cent. of fat. The importance of clean skimming may be realised by calculating the annual loss to a factory separating 1,000 gallons a day, when an excess of one-tenth of 1 per cent. of fat is left in the skim-milk. It will be found that this apparently trifling percentage amounts at the end of a year to over a ton and a half of butter, worth about £140. Next to clean skimming, the points to be looked for in a separator are :—Conditions of cream—*i.e.*, freedom from froth ; capacity in relation to power required ; facilities for cleaning ; strength and simplicity in construction ; and durability of wearing parts.

There should be no unnecessary waiting about the factory on the part of the suppliers for their skim-milk. This state of affairs frequently exists at factories using defective or insufficient separators, and is not calculated to promote the best feeling between suppliers and manager.

Pasteurisers.

There are many different types of pasteurisers now in the market in this colony, all of which are continuous-flow machines, which have been devised from the butter-makers' standpoint. While such pasteurising machinery, having continuous inflow and outflow, is fairly well suited for butter-making purposes, it must be remembered that this method militates considerably against the efficiency of any machine as a germ destroyer. When it is desired to pasteurise milk for direct consumption, or what may be termed high-grade pasteurising, it is best to pass the milk through a separator. It is also necessary to expose the milk to the heat for some minutes ; a few seconds is not sufficient to destroy the disease-breeding bacteria.

In pasteurising for city or direct consumption, pasteurising machines of the intermittent type have recently been introduced. These machines have a central milk chamber, surrounded by an outer shell, which holds the hot water. The whole machine revolves on a horizontal axis, and the milk, besides being exposed to the heat for a time, is thoroughly agitated during the process of heating. This latter process, however, while an excellent means of making a thorough job of the work, would be much too slow for factory purposes.

In selecting a machine for factory work it is always a wise precaution not to select too large a machine, or else to have on hand a small machine for use when small quantities of cream or milk are to be pasteurised. In running large machines at a slow speed with small quantites of cream or milk, we very often find the bottle globules impaired by concussion against the sides. We also find serious losses of fat by using large pasteurisers for heating purposes only.

Coolers.

To obtain good results it is necessary that cream-coolers should have a sufficient area of cooling surface, in order that the temperature of the cream may be reduced to within two or three degrees of the water used for cooling. Coolers may be either of the circular or rectangular type.

Pumping or elevating by Force.

The pumping or elevating of cream by force must be strongly condemned. This system is often applied at factories built on level sites, and very often causes churning or breaking of the fats while the cream is undergoing the process of elevation. It also causes great injury to the texture of the butter made from such cream. One of the main points in an up-to-date butter factory is to have the cream or milk pass through as few utensils as possible. The fewer the spouts and utensils the less cleaning and liability to contamination, and the less loss in handling. The latter is an important item. Where cream must be elevated it should be done by means of an improved cream-elevator, which will cause as little agitation to the cream as possible, and which affords easy access for cleaning.

Cream-vats.

No cream-vat is complete, or well adapted for the purpose, which is not supplied with the means for both cooling and heating the cream at the will of the operator. The butter-maker cannot control the ripening of the cream properly without such facilities. It is necessary, then, that the cream-vats should have a water-tight jacket, through which the cold circulation may pass. The cooling may be done by direct-expansion, or other suitable vats, whereby the cooling-power can be applied by means of brine or chilled-water circulation. The system of cooling by circulating chilled water through a moving coil submerged in the cream is coming into favour at some factories. This system is to be strongly recommended at large central factories where the cream comes in from the skimming stations in an over-ripe condition, or at a stage requiring immediate chilling to check further development of acid. It is, however, not to be recommended over the direct-expansion or brine-circulation vat in factories without skimming stations, or ordinary-sized factories where the cream is delivered in fair condition, and it is only necessary to gradually cool it low enough to solidify the fats and to have it at the proper temperature and degree of acidity at the time of churning.

Churns.

There is perhaps no better churn for factory purposes than the plain box churn with "trunk" lid. Most churns now in use are made with a lid comprising one whole side of the churn, secured by hinges and eccentric fastenings. The half trunk lid is to be preferred, because it is lighter to handle and easy to clean, and allows plenty of room to take the butter out readily.

Very large churns are not advisable. A box churn should be made equal-sided, and not as we sometimes find them, say, 3ft. on two sides, and 3ft. 8in. on the other two—in other words, the ends of the churn should be square. If the sides are unequal, injury will result to the grain of the butter when finishing a churning. All churns should be finished with galvanised fittings.

Butter-workers.

The best worker may be said to be that which works the butter dry in the shortest time without making it greasy. This we find in practice is best effected by having a deep-fluted roller, whose periphery at any given point travels at the same speed as the bed of the table at the same point. The table should slope downwards from the centre to the outside. The iron work should be substantial, and should all be galvanised. All butter-workers should be fitted with a guard round the table for the operator to lean against while working the butter. They should also be fitted with spouts underneath to carry off the brine.

Milk-testing Machines.

The principal method employed in ascertaining the butter-value of milk is the Babcock test. The best machine for factory purposes may be said to be the steam-turbine tester. The machine to be preferred is one so constructed that the steam which drives the turbine is divided from the bottles by a jacket, thus allowing heat enough to keep the bottles hot during the whirling process. With machines where the steam comes into direct contact with the bottles there is a possibility of error when the reading is done from the machine, owing to the expansion of the fat while at the extremely high temperature. Every factory should be provided with a speed-indicator, in order that the speed of the Babcock or machine may be regulated according to the size of the wheel. Where, for instance, a 10in. wheel requires to run about 1,100 revolutions, a 25in. wheel will only require to run 700 revolutions.

Refrigerating or Ice-making Machines.

A freezing machine is one of the most necessary and one of the greatest money-saving appliances in use in a modern dairy factory. There are several makes of machines in the market. Various substances are used in the different machines but those most generally adopted are anhydrous ammonia and carbonic anhydride. Up till a few years ago, machines worked with the latter gas found most favour with dairy factory owners, but the high pressure at which they are operated necessitates so much watchfulness and careful packing to prevent leakage of gas that the ammonia machines are now receiving the most support. A large number of ammonia refrigerators are at work in factories, with most satisfactory results. Care should be taken to procure a sufficiently powerful machine, for in this respect the error has been made at many factories of installing too small a refrigerator."

CONTAGIOUS ABORTION IN COWS.

In view of the impending development of the dairying industry in Western Australia, it is as well that all those who intend to go in for this business should keep themselves posted up in all matters appertaining to the successful carrying out of what must eventually prove a most important undertaking.

The extent of the annual loss to dairymen in some parts of the world through contagious abortion in cows, has reached an alarming extent. Various Government experts and others have given much time and attention to the matter with such good results, that a dairyman of the present day who takes care to be conversant with what is required to be done need not fear any serious results. On page 264 of Vol. XII. of the "Journal" of this Department, a valuable article on this subject was reprinted from a United States

Bulletin; in this issue we reproduce portion of Mr. Brand's report on the matter. Mr. Brand, the Government Veterinarian for New Zealand, has given considerable attention to the matter, and his advice is worthy of following. He deals with the subject as follows :—

Cause.

This is undoubtedly due to a definite microbe, which, gaining entrance to the system of a pregnant cow or heifer, sooner or later causes premature contraction of the womb, and consequent expulsion of the fœtus, or immature calf.

The contagion may be contracted by a pregnant cow through (1) coming in contact with an animal that has already aborted ; (2) coming in contact with the aborted fœtus (it is well known that cows will congregate around such an object, snuff the ground, lick the body, etc.) ; (3) eating grass or fodder contaminated with the discharge from a cow recently aborted, or other material containing the germs of abortion ; (4) (and very important) the use of a bull that has alread served, or been in contact with a cow that has recently aborted.

Symptoms.

As a rule none are exhibited to such an extent as to attract attention. Occasionally evidences of uneasiness and attempts to apparently calve may be observed, but very frequently the first intimation which the owner receives that a cow has aborted is that she comes back to the bull about the sixth or seventh week after previous service. Usually a cow comes to the bull in three days after abortion takes place.

Treatment.

1. Burn the aborted fœtus immediately, search being made for it if necessary, so soon as the cow is known to have aborted.

2. Thoroughly dig up the ground around the fœtus, and disinfect with a liberal quantity of a non-poisonous sheep-dip.

3. Isolate the cow and keep her isolated for two months, using a temporary bail, if necessary, for milking purposes.

4. Thoroughly disinfect the cow by the following means :—

First, into an ordinary whiskey-bottle put two tablespoonfuls of a 1-per cent. solution of mercuric chloride, and fill up with rain-water that has been boiled and allowed to cool to blood-heat. The mercuric chloride can be easily procured from any chemist.

Second, procure about three feet of ordinary indiarubber piping of ½in. diameter, and in one end place an ordinary tin funnel, or, better, one made of glass if procurable. If neither is handy, break off the bottom end of a large bottle, and insert the neck into the rubber tubing.

Third, boil the tube and the funnel for five minutes.

Fourth, place the free end of the piping by means of the hand gently into the womb, taking care not to injure the lining of the womb.

Fifth, hold the end to which the funnel is attached about 6in. above the root of the cow's tail.

Sixth, pour the contents of the bottle as described above gently into the funnel, and so thoroughly irrigate the womb. If the fluid does not run freely from the tube, the end of the womb need only be gently moved to and fro to secure a free flow.

Seventh, thoroughly wash down the parts from the root of the tail down to the bottom of the udder with another bottleful of the same solution as that used for irrigating the womb.

Eighth, allow the animal to stand quietly in the bail for two hours after treatment.

[NOTE.—It is absolutely necessary to follow out the directions to the full, as if any be missed beneficial results cannot be guaranteed.]

The Bull.

If it be known or suspected that the bull has covered a cow that has at any time aborted, he should be placed in a crush-pen and the penis and sheath thoroughly washed with the solution. If many cows have aborted, a special bull should be used solely for them.

Remainder of Herd.

As an extra precaution it is desirable to very carefully wash the passage and parts below the tail of each cow with the solution as described above.

In order to strengthen the resistant powers and prevent undue looseness of the bowels, it has been found advantageous to give a small quantity of hay or oaten sheaves at each milking-time

Buildings.

In aggravated outbreaks the whole of the milking-shed should be thoroughly limewashed, adding to each bucketful of warm limewash half a pint of crude carbolic acid ; a liberal dressing of disinfectant to the floors also being employed.

Yeast.

The use of yeast to destroy disease-producing bacteria has been recently proposed, and the treatment has attracted much attention on account of its simplicity, the harmless (non-poisonous) character of the material used, and its apparent effectiveness. Trials made by the veterinarian of the Nebraska Station (A. T. Peters) indicate that the treatment will prove of value in veterinary practice.

The preparation of the yeast solution and its use is thus described by Dr. Peters :—" Take one cake of either compressed or dried yeast, add enough water to moisten the same ; then allow it to stand at least twelve hours, or preferably twenty-four hours. To this is then added a pint to a pint and a half of luke-warm water. This is used as the cleansing fluid. This treatment is especially promising in case of cows suffering from abortion. The animal to be disinfected is first washed out with luke-warm water, and after being thoroughly cleansed the disinfecting fluid is applied. The same method is pursued in the bull. This treatment is being tried on barren cows also. Knowing that the vagina of barren cows is exceedingly acid, it is hoped to overcome this acidity by repeated injections of fermented yeast germs before service."

The theory is that the acidity of the generative organs is due to bacterial activity, and that yeast solutions introduced as suggested invade all parts of the organs and destroy the bacteria which produce the acid condition.

THE COOL STORAGE QUESTION.

By MORTLOCK.

In order to obtain accurate information as to the cost of equipping and running a cool storage and freezing establishment suitable for the requirements of local farmers, a representative of the *Northam Advertiser* went fully into the matter with some acknowledged authorities on the subject. Having regard to the development of the lamb trade in our midst, it was agreed that the scheme should make provision for handling 1,200 carcases a day during the season, which in this case would extend from the middle of August till about the end of November— a period of some fifteen weeks. It was also recognised that liberal allowance would have to be made for extensions, and the plan referred to is based on that assumption. Under this scheme the establishment can be enlarged—so long as the land is available—almost indefinitely. In order to increase the capacity of the concern it is simply necessary to lay down another plant alongside that already in operation.

The Question of Site.

Emphasis is laid upon the necessity of having a good site for the installation. It would be advisable to have several acres of land. Connection with the railway by means of a siding is imperative. Direct railway communication means a marvellous saving in the handling of the lambs and their carcases. It is also strongly recommended that the site should be outside of the limits of a municipality. More than one reason is urged for this suggestion. It is not pleasant to have abattoirs slaughtering 1,200 sheep a day in the midst of the town. Then the preparation of dried blood and fertilisers from the by-products is a process which should not be carried out where a number of people are dwelling together. Then, again, the first cost of the necessary area would be almost prohibitory in a town, and much more reasonable outside of it. Finally, the annual rates and taxes would be a much lighter impost outside of a municipality than within it. These considerations at once dictate the wisdom of establishing the cool storage depôt outside the limits of the town of Northam.

The Main Building.

The main building would contain the freezing and cool storage chambers. It would consist of two storeys. On the top floor the space would be divided into two rooms. In one there would be provision for chilling 600 lambs a day ; in the other the same number of carcases would be frozen daily. These numbers can be increased by 10 per cent., if necessary, as, except in the case of very heavy lambs, the room provided would hold over 650 in each case. It is expected that chilled lamb will be daily sent away from the works to both the metropolitan areas and the goldfields. With a little organisation it is pointed out that the day's chilling would probably go into immediate consumption. Any held over would be transferred into the freezing room and frozen.

The ground floor of the building would be used solely for cold storage. As the carcases were frozen they would be stacked in it. The capacity would be from 12,000 to 14,000 carcases, according to the size of the lambs. The size of the main building would be 55 x 60.

Outbuildings and Fittings.

The abattoirs, covering a ground space of 30 x 72, would have an asphalted floor, and be built of galvanised iron. Here it may be remarked that a liberal water supply would be a necessary feature of the establishment. The room to house the ice-making plant would also take a floor space of 16 x 26. For power purposes a slightly smaller building would suffice, the dimensions in this case being set down at 16 x 20. The digester and cleaning rooms would absorb 30 x 40 floor space, and galvanised iron would here again be the building material employed. Skin sheds, an asphalted floor on which to dry the blood in the sun, and the necessary pens for the lambs, complete the equipment. It may be remarked here that in a small plant it is cheaper to dry the blood in the sun, and pay wages to turn the material over than it is to pay interest, depreciation, and cost of operation on the larger plant that would have to be provided to do the work mechanically.

The Question of Power.

In a cool storage establishment the question of power is of the first importance. In the process of turning water into ice a considerable amount of energy has to be employed, and a great quantity of fuel consumed. After consulting several of the leading experts in the State, it was made clear that a producer gas plant would be the best for the purpose. To provide the necessary refrigeration for the establishment, an ice-making machine, having an output capacity of 25 to 30 tons every 24 hours is postulated. The power requisite to drive this would be easily supplied by a fifty brake-power producer gas plant. Estimating the value of Collie coal nuts on the mine at 5s. per ton, and transport rates to Northam *via* Narrogin at current figures, the fuel would cost somewhere about 13s. per ton at the local works. There is an approved make of producer gas plant on the market in Western Australia which is equipped with a special tar extractor for use with Collie coals. The management guarantee it to produce a brake-horse power on a pound and a-half of approved Collie coal. In other words, if it fails to achieve this performance, they will dismantle the machine and take it back, and pay all expenses incurred. On this guarantee, and at the price of coal mentioned, the necessary power could be produced at about 6d. per hour.

Cost of the Establishment.

In Western Australia, where timber and building material are reasonably cheap, it is expected that the whole of the buildings and plant could be erected at a relatively low figure. The main building could be cheaply constructed of timber and iron, wood inside, and the galvanised material on the exterior. The construction of the abattoirs, which would make provision for 16 slaughtermen—the building itself being of iron, with cement floors—would not run into large figures. The small, detached rooms to house the ice-making machine, and the power plant, as also the various sheds required, would be plainly and simply built. Including the power plant, which could be landed at Fremantle for £950, the ice-making equipment, the price of land, railway siding, sheds, and various other items, it is stated on the highest authority, that the whole outlay involved in completing the scheme should not exceed £7,000. This figure may, however, be regarded as a maximum, and from what he could learn, the writer expects that the actual expenditure will be from 10 to 20 per cent. less. At the outside the power and ice-making plants landed at the works should not cost more than £2,500. It is difficult to conceive that the buildings and other works will more than double that amount.

Working Expenses.

The item of working expenses was gone into in some detail, as this factor largely determines the practicability of the scheme. In charge of the works an engineer costing £5 per week would be required. Assisting him during the day would be a greaser. The plant would be run by two other assistants of the same class during the two other shifts. Three pounds a week is set aside for these. The clerical work would not require a first-grade accountant, and £3 a week is claimed to be fair pay for the class of man wanted. A foreman butcher would have charge of the abattoirs and the handling of carcases, his services being valued at £4 per week. Under his supervision would be four labourers engaged in bagging and handling the lamb, the value of their work being appraised at 7s. per day. The treatment of the by-products, etc., would find employment for three other labourers at 7s. a day. As the plant would only run for three or four months in the year, interest, and depreciation and insurance charges have to be spread over 15 instead of 52 weeks. The slaughtermen—provision is made for 10, each killing 80 per day—are paid on piece-work, the rate being the highly remunerative figure of 25s. per 100. At the termination of the season the whole plant is closed down.

A Statement of Cost.

It is now possible, with the aid of these facts, to prepare a statement showing the cost per pound of freezing and preparing lamb for export. The figures, on a weekly basis, work out as follows :—

	£	s.	d.
Wages—			
Engineer	5	0	0
Three assistants	9	0	0
Slaughterman	4	0	0
Seven labourers	15	0	0
Clerk	3	0	0
	36	0	0
Fuel on guarantee basis	4	0	0
Eight slaughtermen on piece-work, full time	90	0	0
Interest, depreciation, and insurance (accident and fire)	10	0	0
Chemicals and lubricants	1	0	0
Total weekly cost	141	0	0

What it Represents.

For this outlay 600 lambs would be frozen, and the same amount chilled every day. In all, 1,200 carcases would be daily dealt with, or a total for the week of 7,200. Averaging their weight at 33lbs., the total weekly output would be 237,600lbs. of lamb. Dividing this into the weekly cost, the result is less than a sixth of a penny per pound. In other words, and making allowances for contingencies, a 33lb. lamb can be slaughtered, frozen, and kept if need be, in cool storage for about a fortnight for the modest sum of from 6d. to 8d. This figure compares favourably with the actual experience of other freezing establishments in Australia. Considering the cheapness of land and power, and the absence of proprietary profits, the project referred to should be able, under competent management, to meet the requirements of the local lamb trade a trifle cheaper than any similar establishment in Australia.—*Northam Advertiser.*

THE INFLUENCE OF ELECTRICITY AND ANÆSTHETICS UPON PLANTS.

By James Pollitt.

For some years past the attention of botanists in the old world, most notably in Germany and France, and to a lesser degree in England and America, has been patiently devoted to the more rapid and perfect development of plant life by the application of forces which had previously only been thought of, if at all, as having the slenderest practical application to the vegetable kingdom. It is only when we view the extraordinary developments of a century's work in all other branches of science that we see by contrast the remarkable conservatism of the botanical world. In some thousands of years we have altered the fashion of our implements, as we were bound to do, and the spread of civilisation into new continents and climates has taught us the necessity of altering the season for certain work. Thus, the long dry Australian summer, succeeded by a comparatively short-growing season, has demonstrated the necessity of ploughing our wheat fields at the end of the winter, so that with the first rains of the succeeding winter the seed may be immediately sown on ground already prepared, and the period of growth thus considerably lengthened. The modern use of chemical fertilisers is an even more valuable innovation, but even in this we introduce no new elements, but simply give back to the soil, but in an economically condensed form, the same fertilising elements which our forefathers gave back when spreading the more bulky animal and vegetable manures. The path of the agriculturist has indeed been worn smooth by the practice of ages, and our interest in the latest discoveries of scientists is greater by reason of the entirely new directions in which they are working, and the previously neglected forces which they are employing. When we indulge in a mental vision of the future West Australian farmer lounging in an easy chair, and stimulating the growth of his wheat crop by the simple process of pressing an electric button, the comic side of the situation is distinctly the most prominent. Unfortunately we cannot promise such an immunity from worries and toil, but electroculture, or the stimulation of plant life by the application of electric currents, has been so tested and proved that it has to be regarded as an established scientific principle, and, under certain conditions, will probably be established in common practice.

Our knowledge of electroculture is principally due to Professor Lemstrom, of Helsingfors University, who, for a number of years past, has been working experimental fields in England in connection with the Durham College of Science, and also in Germany and Sweden. The Professor's experiments cover a wide range of plants, and some of the results obtained from the electrified fields are distinctly interesting. The yield of strawberries showed in increase of from 50 to 128 per cent. over those grown under ordinary conditions, wheat, 40 per cent.; potatoes, 20 per cent.; beet, 26 per cent.; and so on. It is claimed that the figures do not indicate the results of only the most successful plots but are a fair average of a large number, and as the treatment was varied for experimental purposes, it is expected that the increased yields will be more remarkable when only the most satisfactory methods are practised, and the Professor confidently relies upon obtaining a general increase of 45 per cent. for all crops.

In considering this development from a financial standpoint, Professor Lemstrom, whose estimates are, of course, based upon European yields and prices, is confident of success, whereas the Australian agriculturist would see in it nothing but failure. The Professor estimates the initial cost of equipping a 25-acre field at about £4 6s. 6d. per acre, and the annual upkeep at about 18s. 5d. per acre. Taking the normal yield of wheat from good land at 35 bushels worth 3s. 6d. per bushel, an increase of 45 per cent. due to the electric current, would give an additional 15¾ bushels per acre worth £2 15s. 1d., less 18s. 5d. working costs, which would leave a net profit of £1 16s. 8d. due to electroculture. The Australian agriculturist estimating a normal yield from good land at 15 bushels worth 2s. 6d. per bushel, would secure an increase of only 6¾ bushels worth 16s. 10d., while the cost of both equipment and upkeep would be considerably raised against him. Under these conditions Australian farmers will only regard this branch of electroculture as a matter of scientific interest, and probably remain sceptical as to its practical value in any country. It should be noted that Professor Lemstrom's experiments have been confirmed by others.

French men of science, working on somewhat similar lines, are attempting to utilise the electricity of the atmosphere. An instrument is set up in the centre of a field and connected with a network of wires running through the soil. By this means it is claimed that considerable increases have been obtained in crops of potatoes, peas, tomatoes, etc., and as the electricity is drawn from an inexhaustible source the further development of this method will probably be watched with greater interest than any other. In brief, it has been abundantly proved that electricity is a powerful stimulant to plant growth when applied under certain conditions. It appears to be of little effect in bright sunshine, and totally ineffective during wet weather.

But it is not merely as a stimulating agent that electricity becomes of such interest to agriculturists. Its destructive powers are also to be utilised, and if general practice establishes the contention of certain experimentalists that electricity is an effective and practical agent in the eradication of phylloxera, through this branch of service alone its value to civilisation will be enormously increased. In Australia we have never yet suffered anything even remotely approaching the desolation experienced in European countries through this enemy in the vineyard, but we have had a slight taste of it, and have only kept it in check by rooting up and burning every vine in every vineyard that has been in any degree affected. The sweeping measures adopted were unquestionably wise, and a great industry was saved by the thoroughness of the government supervision, and, in this instance at least, the inflexible administration of the law. But no remedial measure could be more costly than that of utterly destroying a large vineyard containing many thousands of healthy and profitable vines, because, perhaps, only one or two vines in that vineyard had been found affected by the phylloxera, Consequently there followed a vehement demand for the propagation of phylloxera resistant stocks, and it was hoped the general adoption of this preventive measure would, in the course of a few years, render the enemy practically harmless. The writer recollects being engaged, when a youth, in propagating from seed about a dozen varieties of American phylloxera-resistant vines. Of the varieties introduced some were practically worthless for the purpose, whilst others, *V. Riparia* and *V. Repestris,* were, and still are, the most effective of all resisting stocks. From that neuclus the government established a plot of phylloxera-resistant vines, and in twelve or fifteen years, by constant propagation from cuttings, a sufficent number of the most effective resistant stocks could have been raised to convert every vineyard in the State. Yet it is questionable whether one per cent. of Australian vineyards are phylloxera-resistant, or whether amongst all the young vines now being raised in nurseries, any greater percentage are worked on resistant stocks. Our most effective remedy in the event of any sudden outbreak is still to burn and waste, and for every vine diseased thousands of healthy ones must be destroyed. That waves of electricity should be transmitted through a few yards of the earth's surface with sufficient force to destroy life in various insects, eggs, and larvæ, would appear to most minds less difficult than transmitting similar waves through hundreds of miles of atmosphere, and under such control at these remote distances as to perform the work assigned them with the utmost accuracy, and even if the secrets of the force have not yet been sufficiently revealed, its future common use as an agent in the fight against phylloxera may at least be considered amongst the highest probabilities.

Another new and very interesting development in plant life is due to the labours of Dr. Johannsen, of Copenhagen, whose efforts have been directed to testing the influence of anæsthetics upon plants, and who has demonstrated that plants, after being subjected to a bath of ether or chloroform, emerge in a condition which enables them to attain maturity in a considerably less period than if treated by the ordinary forcing methods of the hot-house. The plants to be treated are first allowed to become very dry. They are then placed in a large box which is capable of being hermetically sealed. To the inside of the lid a flat shallow dish is attached, and a hole bored through the lid of the box through which the ether is poured. The hole is then immediately closed, and, as the ether evaporates, the heavy vapours flowing over the side of the dish fall to the bottom of the box and completely envelop the plants. The period allowed is about 48 hours, after which the plants are taken out and allowed to develop under the ordinary influences of the warmth and moisture, when the buds and flowers sprout far more rapidly than with the unanæsthetised plants. The abnormal period of profound rest appears to invest the subjects with extraordinary vitality and they awake with a keen desire to make up for lost time. After a burst of hard work in the warmth and light of day a period of nightly repose is as necessary to plant life as it is to human life. This, indeed, has been demonstrated by some of the electroculturists, who, after attempting to force their vegetable subjects by keeping them constantly under the influence of electric light, have only produced weak and sickly growths far below normal, whereas an artificial lengthening of the day, a few hours of electric light in the evening, and again before daybreak with a restful period between, has produced results generally above normal. In this respect, however, plants are singularly human. Under unnatural force a greater amount of work is accomplished in a given time, but the period of life is generally shortened.

We would suppose that if Dr. Johannsen's subjects were taken from plants already in the active exercise of their breathing functions their confinement for two days and nights in a box hermetically sealed, would leave them too enfeebled to be dangerous competitors in any race against plants more kindly treated. Our Australian practice of enveloping trees in airtight tents for the treatment of scale diseases with hydro-cyanic gas, has shown us that a suspension of the breathing functions for only a few hours during the day is injurious, and sometimes fatal to the strongest trees. The idea is principally to take plants already in a more or less dormant condition, and to deepen the state of their repose. The actual cause is probably far from understood, but it is certain to receive the closest thought and observation, and, altogether, there have been few developments of greater interest to botanists than the anæsthetisation of plants.

MULES FOR DRY CLIMATES.

By H Sessions, Wootton Manor, Henley-on-Thames, England.

When we remember the thousands of magnificent mules there are in the world, and that every mule has a jackass for a father, we can at once appreciate the reason for the high values of the best donkeys. During visits I have paid to various parts of the world I have observed that there seems to be a pretty well defined line North and South of the Equator within which mules abound, and that this line divides the world into one part in which mules thrive and prosper, and another part where the horse becomes more profitable and satisfactory than the mule. This line is one of climate, and it is in the hot, dry, sunny regions where herbage is scarce and dried up, and where water is difficult to obtain, that the mule has established himself as the animal of daily work.

What I have designated as the mule line extends North from the Equator, and includes Africa and Europe up to the 45th degree of latitude, Asia and North America as far as the 35th degree. On the South side of the Equator we can include most of Africa, the Northern half of Australia, and South America as far South as the 35th degree. Within this vast radius hundreds of thousands of mules are bred each year. Many of the mules are big, heavy animals, with great power and bone, and stand 16 and 17 hands high, and to breed them it requires jackasses of great size and substance, and there is keen competition among mule-breeders to obtain the best jackasses possible. As mules do not breed, and there is no instance known of any mule reproducing itself, it becomes necessary to breed donkeys for the purpose of mule-getting, and in various parts of the world there are breeds of donkeys bred for the purpose as distinct and different from each other as the breeds of horses of the present day.

Although there are a number of donkeys bred, it is increasingly difficult to find good ones. A jack has as many defects as a horse, and the Spanish owners are as good judges of form, type, and soundness in an ass as a horse-dealer is of a horse. Besides many diseases and unsoundnesses that the ass is liable to, defects of conformation are numerous, defects which depreciate the value of the jack as a good stock-getter.

The Poitou ass may be regarded as the cart-horse type of ass. He is a brown ass with a long, shaggy coat ; he has powerful limbs, great bone and feet, a good body, and stands from 13.3 to 14.3 hands high. He is carefully bred in limited numbers. He is kept in small stables and requires much care, and the small farmers in France who own these jacks value them highly. The French consider the long coat a great acquisition, bespeaking pure breed and a mule-getter, but in hot countries the coat is frequently objected to, as it harbours parasites.

In Spain and the Mediterranean there are numerous breeds of asses, the most valuable being the Catalonian and Andalusian, and for mule-breeding the former are preferred. The Catalonians are black, with mealy muzzles and underlines. They are very tough and wiry animals, and quite the best sires for mules. Bred in the mountains and somewhat interbred, when crossed out they get bigger stock than larger jacks raised under more favourable conditions.

The Catalonian jack is the foundation stock of the Kentucky jackass, importations having been made in the early half of the last century to the United States of America. In many of the American donkey-breeding farms the stock has got a cross of Poitou as well as the Catalans, and some very fine jacks are bred. The produce of these jacks are the 16-17 hands high mules which we see in Missouri and Kansas and some of the Eastern States of North America, and for weight and substance I do not know any part of the world which equals them. It is noted, however, by American breeders, that a Catalan jack of 14h. 2in. high will produce as equally big a mule as an American-bred jack of 15 hands, and American breeders, in order to keep up the vigour, character, and quality of their studs, keep importing Catalonian and Poitou jacks.

Some of the very finest of these black jacks are bred in the Balearic Islands, but they are limited in number, and high in price. In Morocco the Moors have an ass of the Catalan type, but they do not yet appreciate the value of breeding for market purposes, probably because should they breed a particularly fine animal the unsettled state of the country would prevent their realising any benefit.

In Egypt the donkeys are grey ; they have not the stamina of the French or Spanish, or the width or size, and are rarely used out of their own country. Sometimes a few are imported into England by visitors who have been struck by their fine appearance as compared with our native donkeys, but they have not the value of the Poitou or Catalan, as there is no European or American demand for them as mule sires.

The Persian donkey is in colour and size very like the Egyptian. In South Africa the native breed of donkey is small, and in South America they are somewhat similar, but on both continents they are being graded up by the use of imported Spanish sires. In Ireland, where there are about a quarter of a million donkeys, an effort is being made to increase the usefulness of the native donkey by the use of jackasses of larger size and better breeding, and there is no reason why Ireland should not produce jackasses of great bone and quality fit for mule-breeding in any part of the world, and a market can be opened up with India and our own colonies, where the demand for good jacks will probably increase for many years to come.

During the last few years I have made numerous journeys to many parts of the world in connection with donkeys, and they have proved of the greatest interest. In Europe and Africa the journeys take you far from the beaten track of the tourist, and it is only after many fruitless journeys that you learn where the best of some particular type of ass is to be found, and then it is often in some remote and wild spot. There is so much to be learned about donkeys and donkey and mule-breeding that it is difficult to condense the subject into a few brief notes, and I have only attempted to illustrate the importance and variety of donkey-breeding, as there are many parts of England and Ireland where it would pay well to give the matter a little thought and attention, and to try to breed a donkey which would be of much greater value than those which are bred to-day.—*Dalgety's Review.*

COLD STORAGE POULTRY FALLACIES EXPLODED.

By Dr. Henry A. Higley.

We reproduce from the columns of our esteemed New York contemporary, *The National Provisioner,* a very careful and expert discussion by Dr. Higley on a question very largely affecting the poultry trade in all countries. In introducing Dr. Higley's article, our contemporary says :—

Packers', retailers' and cold storage interests generally are affected by the crusade of the faddists all over the country against the marketing or storage of undrawn poultry and game. There are Bills before many legislatures, and ordinances proposed in numberless city and town councils. The New York case discussed by Dr. Higley is typical of the attack made on poultry and cold storage interests everywhere. Dr. Higley is director of the Brooklyn Diagnosis and Research Laboratory, bacteriologist and pathologist to several New York hospitals, and an expert of note in his field. He has made a careful study of this question, and his report may be taken as a guide by the trade everywhere in fighting the drawn poultry and anti-storage faddists.

There is now pending before the Legislature of the State of New York an amendment to Section 165 of the Agricultural Law defining certain merchandise, the sale of which is prohibited. The amendment is as follows: —"If it consists of any slaughtered game, animal, poultry, or fowl, unless the carcases of such slaughtered game, animal, poultry, or fowl shall have been divested of its lung tissues, entire digestive and intestinal tracts, gall receptacle, crow, and gizzard lining within twelve hours after its slaughter ; and any slaughtered game, animal, poultry, or fowl found in any refrigerator, ice chest, cooler, storage apartment, or market, whether exposed for sale or in stock, shall be presumed to have been slaughtered for a period longer than twelve hours."

The claims of the supporters of this measure are set forth in a paper which was read at the annual convention of the American Association of Railway Surgeons at Chicago, Illinois, October 17th, 1906, by Dr. M. Cavana, of Oneida, New York. This article is devoted to the "Dangers in Undrawn Poultry and Game." It is claimed by Dr. Cavana in this article that poultry and game which has been killed and kept undrawn in cold storage is unfit for human food. He states that this is so because the intestinal and thoracic cavities of healthy poultry and game contain large numbers of bacteria of various kinds ; which bacteria, or their poisonous products, are harmful when eaten by man, and which bacteria migrate soon after the death of the birds from their intestinal and thoracic cavities into the surrounding and edible portions, infecting these portions and rendering them capable of causing disease and death when eaten by human beings. Contrariwise, it is claimed by Dr. Cavana that if such game be drawn at the time of killing, or within twelve hours thereafter, no such dangers exist, and that the birds are perfectly safe and suitable for food.

No Question of Diseased Poultry.

Before entering into a refutation of these claims, there are two points in connection with this measure which deserve very careful consideration :

1. This measure has no relation whatsoever to the question of the killing and the offering for sale of diseased poultry and game. That point is already covered by the laws of the State of New York as they now stand. It is not claimed, therefore, by the supporters of this measure that the poultry is diseased at the time of its killing. On the contrary, it is claimed by them that this poultry, at the time of its killing, is perfectly healthy, and that this condition of things, for which remedy is sought, comes to pass in the bodies of healthy, dead, undrawn poultry and game within a few hours after its death, or during its preservation by cold.

2. This measure has no relation whatever to the question of offering for sale of decayed, decomposed, or putrid poultry and game. This point is already covered by the laws of the State of New York as they now stand. It is not claimed, therefore, by the supporters of this measure that this poultry and game is decayed or decomposed or putrid when offered for sale. On the contrary, it is claimed by them that when offered for sale it is perfectly sound so far as evidences of decay, decomposition, or putrefaction are concerned, and that it may now be legally offered for sale within the laws of the State of New York as they at present exist.

In refuting the claims of the supporters of this measure, I shall take up the subject under the following headings :—

1. Established facts of bacteriology relating to the subject, with obvious deductions therefrom.
2. An analysis of the statements made by the supporters of this measure in defence of their claims.
3. My own bacteriological observations concerning the subject.

Established Facts of Bacteriology.

The bacteriological facts to be now set forth are verified and substantiated by quotations from the three following standard text books of bacteriologyy : Mace's Bacteriology, by E. Mace, Professor of Hygiene and Director of the Institute of Sero-therepy of the University of Nancy, France ; Park's Pathogenic Bacteria and Protozoa, by Dr. William H. Park, Professor of Bacteriology and Hygiene, University and Bellevue Hospital Medical College, and Director of the Research Laboratory of the Department of Health, City of New York ; and Gunther's Bacteriology, by Dr. Carl Gunther, Professor of Bacteriology in the University of Berlin, Germany.

The supporters of this measure specifically state and allege that the following species of bacteria are responsible for the condition of things which they seek to rectify :—Bacillus coli communis, bacillus proteus vulgaris, staphylococcus pyogenes aureus, streptococcus pyogenes.

On the contrary, the facts relating to these bacteria are these :—

1. All of these bacteria are normally present in the intestinal tract of healthy human beings.*

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*Quotations from the authorities on bacteriology referred to, in support of the statements here made.

2. All of these bacteria are widespread throughout nature, being present in water, air, and soil.*

3. These bacteria gain admission to man's intestinal tract by being taken into the mouth in the food that he eats, the water that he drinks, and the air that he breathes.*

From these three facts we get the obvious deduction that these bacteria or any products produced by them while in the intestinal tract of man are not dangerous or deadly to him, for if they were the human race could by no possibility of chance have existed until the present hour.

4. These bacteria and the products produced by them while in man's intestinal tract are beneficial to him, in that they aid in the digestion of his food.*

5. These bacteria, under certain conditions, may produce diseases in man.*

6. The only condition, so far as the presence of these bacteria in the intestinal tract of man is concerned, under which they can produce disease in him is when they pass from the intestinal tract through a diseased mucous membrane into the surrounding tissues and organs.*

The obvious deductions from these six facts are these :—

1. These bacteria, or products produced by them, while in the intestinal tract of man are not only harmless, but beneficial to him.

2. The production of disease in man by these bacteria, or their products from his intestinal tract, is not dependent upon their presence in his intestinal tract, because they are always there. Their presence in man's intestinal tract is not the deciding factor as to whether they do or do not produce disease from there. The deciding factor is the presence of a diseased intestinal mucous membrane.

3. No regulation regarding any one article of food would have any effect whatever in ridding the intestinal tract of man of these bacteria, or products produced by them while in his intestinal tract. In order to do this it would be necessary to compel man to eat sterilised food and to drink sterilised water and to breathe sterilised air.

4. It makes no difference whatever whether poultry be drawn or undrawn, or whether it shall never again be eaten by human beings—in any of these events these bacteria, and the products produced by them while in man's intestinal tract, will still be there.

Cold Storage and Bacteria.

Facts concerning the action of cold upon bacteria and bacterial growth are as follow :—

1. In general, all bacterial growth ceases at 5deg. C. (41deg. F.).

2. Certain bacteria which are concerned in producing the process of putrefaction grow at a temperature as low as 0deg. C. (32deg. F.).

3. All disease-producing bacteria (those we are considering here) cease to grow at 0deg. C. (32deg. F.).

4. The most favourable temperature for the growth of disease-producing bacteria is 37deg. C. (98.6deg. F.).

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* Quotations from the authorities on bacteriology referred to, in support of the statements here made.

5. Unfavourable conditions of temperature produce unfavourable conditions for bacterial growth.

6. Bacteria, when placed under favourable conditions of growth, while they may remain alive and look the same, lose their power of producing poisonous products.

7. Bacteria at the freezing temperature (in ice) not only lose their power of growth, but gradually die.*

Obvious deductions from these seven facts are, therefore, as follow :—

1. No matter how many of the bacteria which are concerned in this discussion there may be in the intestinal and thoracic cavities of dead, undrawn poultry and game, they cannot invade the edible portions so long as the temperature of such poultry and game is kept at 5deg. C. (41deg. F.) or below, because these bacteria do not grow at such a temperature or below.

2. Dead, undrawn poultry and game kept at a temperature (above 41deg. F.) which would allow the invasion of its edible portions with these bacteria mentioned from the intestinal tract would be subject to putrefactive changes, because such a temperature would be much more favourable for the growth of the bacteria, which produce putrefaction, since they can grow as low as 0deg. C. (32deg. F.).

3. Even if the bacteria invasion claimed by the supporters of this measure does take place, such bacteria can produce no poisonous substances because they are placed under unfavourable conditions of growth so long as the temperature of the fowls is kept anywhere near 5deg. C. (41deg. F.).

4. The longer dead poultry and game is kept frozen the less bacteria will it contain, because freezing temperatures gradually destroy bacteria.

Facts concerning Ptomaines and Toxines.

Having seen that while these bacteria, or the products produced by them while in the intestinal tract of man, do not produce any harmful effects upon him, it is proper to ask, can these bacteria growing outside the body produce any poisonous products which, when eaten by man, can cause disease and death in him? The answer to this is yes ; under certain favourable conditions of growth they may. The poisonous products produced by bacterial growth are divided into two great classes, ptomaines and toxines :

1. *Ptomaines.*—These are products of bacterial growth produced during the process of putrefaction.

2. Putrefaction is caused only by the growth of bacteria. There can be no putrefaction unless there is bacterial growth, for it is bacterial growth that causes putrefaction.

3. Some ptomaines are poisonous and some non-poisonous.

4. Bacteriologically, putrefaction is divided into three stages. It is only in the third or last stage of putrefaction, when the meat is plainly putrid and unfit for use, that poisonous ptomaines are present.

5. Poisonous ptomaines or products cannot be produced by the bacteria here being considered when they are placed under unfavourable conditions

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*Quotations from the authorities on bacteriology referred to, in support of the statements here made.

of growth, that is, anywhere near 5 deg. C. (41deg. F.). (For proof see previous section on Cold Fact, No. 6.)*

The obvious deduction from these five facts is this :—

In the edible portions of undrawn poultry and game no poisonous ptomaines can be present unless the meat is plainly putrid and unfit for use, and which cannot now be legally sold under the laws of the State of New York as they at present exist.

Toxines.—These are poisonous products of bacterial growth, but not necessarily produced during the process of putrefaction.

1. The toxines produced by disease-producing bacteria are the same, no matter whether the bacteria be grown inside or outside the animal body. This is so, because all that is known about toxines to-day has been ascertained by growing bacteria outside the body and obtaining thus their toxines. The production of the various anti-toxines, such as that used in the treatment of diphtheria, has been accomplished by growing the bacteria outside the body and obtaining their toxines.*

2. From a consideration of fact No. 6 in the previous section on cold, it is perfectly obvious that even if the bacterial invasion takes place as claimed by the supporters of this measure, no poisonous toxines could be produced if the temperature of the poultry is kept anywhere near 5deg. C. (41deg. F.), because the bacteria are placed under unfavourable conditions of growth.

3. Even if such toxines were produced, they are perfectly harmless when eaten by man, because it has been shown in the first section on facts relating to these bacteria, fact No. 1, that these bacteria are present normally in the intestinal tract of healthy human beings.

Analysis of Statements made by Faddists.

Before entering into an analysis of the statements made by the supporters of this measure, it is fair to ask in the light of the established bacteriological facts which have been stated in the previous section, what sort of evidence must anyone produce in order in any way to substantiate the claims made by the supporters of this measure ? The answer to this question is now very clear in the minds of all who have followed the facts as already set forth. Anyone who would bring proof that the claims of the supporters of this measure are in any way true must :

1. Revolutionise the established facts of bacteriology relating to this subject. They must show by their own experimental evidence that these bacteria and their toxines are harmful where eaten by man, and that poisonous ptomaines are produced before the third stage of putrefaction is reached, when the meat is plainly putrid and cannot now be legally sold. And then very far and beyond all this, they must show that their experiments in this respect have been confirmed by recognised bacteriologists, and are accepted by the bacteriological world at large.

And then very far and beyond all this, they must go right down into the poultry industry, as it is at present carried on, and by practical demonstrations show that these bacteria and their toxines are present in the edible portions of undrawn poultry and game as now sold, and that poisonous ptomaines are there before the meat becomes putrid.

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*Quotations from the authorities on bacteriology referred to, in support of the statements here made.

In none of these respects have the supporters of this measure in the least degree met these requirements. Let us analyse their statements, and see the manner of proof which they present in defence of their claims. The statements which they make may be grouped under three headings, as follow :—

1. Quotations from Dr. Joseph McFarland's Pathogenic Bacteria, to show that these bacteria produce disease in man.

2. A set of experiments purporting to show the presence of the bacterial invasions claimed.

3. A set of cases of supposed victims of infected poultry.

"1. Quotations from Dr. Joseph McFarland's Pathogenic Bacteria to show that these bacteria produce disease in man."

Not one word of this question, except the statement that bacillus coli communis "seems to be the pathological agent of the greater number of summer infantile diarrhœas," has any relation whatsoever to the question under discussion here. The point of discussion here is not at all what toxines or diseases these bacteria produce. The point of this discussion is solely and entirely whether these bacteria and their toxines are harmful and disease-producing when eaten by man. Not one word in McFarland's book, or any other recognised text-book on bacteriology, with the exception of diarrhœas above referred to, states for a moment that these bacteria or their toxines are harmful when eaten by man.

That these bacteria produce these toxines and diseases under certain conditions of inoculation and infection is a recognised fact, but that has nothing to do with the question under discussion here, for it is well known and established, as already set forth in this article, that when eaten by man they are perfectly harmless, because they are always present in the intestinal tract of healthy human beings. As already said, not one word of this quotation from McFarland, except that relating to diarrhœas, has anything whatever to do with the question under discussion here. Now let us look into this diarrhœa question, and see what it amounts to. I quote here from Park's Pathogenic Bacteria and Protozoa, page 243 :—"Bacteriologists are inclined to doubt that the colon bacillus is an etiological factor in the production of diarrhœa, but believe that it is rather due to other slightly different bacteria, which resemble the colon bacillus." "Such bacteria are colon-like, such as the paracolon or dysentery group of bacilli." McFarland in his book, only hints that the bacillus coli communis may be the cause of these diarrhœas, he says, as quoted, that they "seem to be." Park says definitely that they are not, and are not so recognised by bacteriologists.

(To be continued.)

GARDEN NOTES FOR JULY

By G. CHITTY BAKER.

The month of June has proved to be exceedingly wet, over the average of rain having fallen. This will retard garden operations to some extent; the ground being wet and cold, growth will be very slow and weak.

Advantage should be taken of the rains to note where additional drains are required, and also see if those already laid are working properly. This matter is quite as important as cultivation, for no success can possibly be obtained in water-logged soil.

Successions of sowings, as recommended last month, may be made when the state of the ground will allow.

Preparations where possible should be started for the early planting of potatoes. The most promising kind known at present is the Factor. Notes on this tuber are contained in a report published in this issue by Mr. G. Berthoud, manager of Hamel Experimental Farm.

Hot beds should be in readiness and seed sown of tomatoes and cucumbers. Where this cannot be done, seed may be sown in pots, placed on a verandah, and covered in of a night; always remembering that it is the earliest crop that pays.

NOTES ON THE CLIMATE FOR THE MONTH OF MAY, 1907.

It is usually easy to indicate for each year a definite day upon which we may say that the summer or autumn ended and winter commenced. This year it is not quite so well defined. A decided winter storm occurred at the end of April, and a smaller disturbance of a winter type affected the extreme S.-W. portions on the 4th and 5th of May. But the summer heat was very much in evidence between and after these dates, and we may say with a fair amount of definiteness that it disappeared and gave place to regular winter conditions on the 16th. The recent summer has been the most severe experienced in Perth and the lower portion of the west coastal districts since the Observatory was established in 1897, and the average of the maximum day temperature has been above the mean for previous years in every month from November to May, as will be seen from the following table :—

Mean Maximum at Perth.

1906-7.		Mean of previous years.
November	75·1	74·8
December	84·8	80·3
January	85·6	84·0
February	87·5	84·2
March	83·1	81·6
April	78·0	75 8
May	71·3	68·6

It maintained its character up to the end, and on May 1st, 2nd, and 3rd, the thermometer read respectively 89.0 degress, 90.4 degrees, and 89.9 degrees, and again on the 11th 83.7 degrees, whereas the highest reading ever recorded in previous months of May was 84.0 degrees.

It is rather curious, and well worthy of remark, that this abnormal heat appears to have been experienced only in the extreme S.-W. corner of Australia. Throughout the Goldfields and in the Eastern States the summer has been usually mild.

After the 16th winter conditions mostly prevailed, though there was a fine interval from the 20th to the 25th.

On the whole the pressure was very slightly above the mean for previous years, and the temperature was distinctly above normal, though only slightly so on the Coolgardie Fields.

Rainfall was slightly above the average throughout the S.-W. division, but elsewhere below. In the tropics most stations reported "nil."

Frosts have not yet been severely felt, though the temperature of the surface of the ground has occasionally fallen below freezing point, the lowest readings being 25 degrees at Wandering, and 26 degrees at Walebing, Bridgetown, and Southern Cross. The following table shows the mean and extreme readings of a minimum theremometer placed on the ground :—

Station.	Mean.	Lowest	Date.	Station.	Mean.	Lowest.	Date.
Peak Hill ...	48·6	33·3	20	Perth Observatory	48·3	37·2	18
Cue	45·6	30·2	19, 20	Wandering ...	35·6	25·0	21, 22
Coolgardie ...	40·6	30·2	23	Bridgetown ...	36·4	26·0	10
Southern Cross ...	37·0	26·0	21	Karridale ...	46·0	35·0	10
Walebing ...	39·1	26·0	19	Katanning ...	39·0	30·0	22
York	41·1	31·5	19	Mt. Barker ...	39·8	29·9	15

W. E. COOKE,
Government Astronomer.

The Observatory,
Perth, June 12th, 1907.

The Climate of Western Australia during May, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						May, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
NORTH-WEST AND NORTH COAST:	Wyndham	29·971	29·976	30·118	29·795	90·1	73·5	81·8	94·8	66·8	90·4	71·7	100·4	58·0	2	1	1,870
	Derby	29·982	29·982	30·137	29·814	91·1	63·2	77·2	96·0	55·6	90·1	64·2	98·8	46·0	*Nil*	...	2,167
	Broome	30·000	29·984	30·104	29·863	88·7	64·2	76·1	95·0	56·9	88·2	63·6	97·9	46·4	*Nil*	...	2,077
	Condon	30·024	30·023	30·196	29·769	85·2	56·2	70·7	92·8	48·0	82·8	58·0	94·0	42·0	*Nil*	...	794
	Cossack	30·035	30·028	30·230	29·810	86·0	61·0	73·5	91·0	53·0	83·6	62·8	93·9	...	*Nil*	...	1,899
	Onslow	30·153	30·026	30·246	29·869	86·4	60·3	73·4	99·0	44·4	83·7	59·7	97·9	48·8	20	1	570
	Winning Pool ...	30·055	...	30·246	29·887	85·9	55·2	70·6	97·8	43·0	...	...	...	42·0	15	2	893
	Carnarvon	30·100	30·071	30·300	29·874	80·2	57·7	69·0	98·0	45·2	78·4	57·7	95·6	48·8	47	4	266
	Hamelin Pool... ...	30·101	30·068	30·324	29·928	78·8	55·0	66·9	95·2	42·2	76·7	55·6	89·8	42·0	58	3	128
	Geraldton	30·140	30·102	30·407	29·929	75·9	54·4	65·2	94·0	43·0	73·8	55·6	89·0	39·3	349	12	486
INLAND:	Hall's Creek	30·040	30·066	30·234	29·779	86·0	56·7	71·4	92·0	45·2	83·5	55·7	98·0	36·4	*Nil*	..	1,541
	Marble Bar	...	...	...	...	89·1	59·2	74·2	97·5	51·0	87·5	61·4	97·0	44·0	*Nil*	...	804
	Nullagine	30·060	30·040	30·299	29·871	85·5	51·0	68·2	92·0	43·0	81·9	53·8	94·0	38·0	*Nil*	...	579
	Peak Hill	30·016	30·085	30·315	29·886	77·0	52·9	65·0	88·3	41·8	74·2	53·3	90·8	38·8	39	2	487
	Wiluna	30·128	30·068	30·343	29·827	76·5	47·3	61·9	86·0	35·0	74·7	50·2	91·0	31·9	48	1	409
	Cue	30·132	30·113	30·431	29·878	77·4	50·3	63·8	90·5	32·8	74·3	51·7	93·3	35·9	6	2	445
	Murgoo	...	...	...	...	77·0	50·3	63·6	89·5	36·5	...	...	...	...	51	2	361
	Yalgoo	30·118	30·107	30·449	29·863	74·0	48·7	61·4	88·8	37·9	72·8	50·1	94·0	35·7	54	3	363
	Nunngarra	...	...	...	...	72·2	46·7	59·4	86·2	33·1	...	...	...	...	46	3	402
	Lawlers	30·185	30·129	30·450	29·820	74·0	47·0	60·5	86·0	34·0	71·2	50·1	89·9	33·1	70	2	444
	Laverton	30·172	30·134	30·471	29·758	72·4	47·6	60·0	85·0	34·2	71·8	49·8	91·9	30·7	63	2	632
	Menzies	30·159	30·146	30·447	29·848	68·0	47·7	57·8	85·5	32·0	69·1	48·5	89·0	32·1	58	3	277
	Kanowna*	...	...	...	...	69·4	45·7	57·6	82·0	36·0	67·4	48·2	87·6	32·3	163	4	639
	Kalgoorlie	30·176	30·152	30·461	29·794	70·5	48·0	59·2	86·0	36·0	68·4	48·9	88·1	34·5	131	4	561
	Coolgardie	30·188	30·150	30·488	29·806	68·5	46·0	57·2	86·5	36·0	68·1	47·8	88·4	34·1	128	8	766
	Southern Cross ...	30·170	30·130	30·470	29·870	71·0	42·0	56·5	89·0	30·0	68·9	45·3	90·0	30·0	62	5	324
	Kellerberrin	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...
	Walebing	...	...	...	...	70·6	45·2	57·9	88·0	31·4	67·6	47·4	84·7	31·4	302	9	576
	Northam	...	...	...	...	71·9	43·6	57·8	89·5	35·5	68·2	47·3	85·0	34·3	291	8	525
	York	30·168	30·132	30·486	29·828	71·0	44·5	57·8	88·0	35·0	68·9	46·2	85·0	32·0	294	10	477
	Guildford	...	...	...	...	72·9	46·6	59·8	92·5	36·8	69·4	50·6	85·0	33·5	402	11	648

* Averages for three years only.

The Climate of Western Australia during May, 1907—*continued.*

Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
					May, 1907.					Average for previous Years.						
	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
South-West and South Coast:																
Perth Gardens	30·135	30·122	30·461	29·853	71·2	51·4	61·3	87·8	41·5	69·5	50·8	92·0	35·0	524	11	723
Perth Observatory ...	30·150	30·121	30·479	29·847	71·3	52·7	62·0	90·4	42·1	68·6	52·6	84·0	39·9	518	11	730
Fremantle	30·141	30·012	30·474	29·829	70·4	55·8	63·1	84·0	44·0	68·5	55·2	80·4	43·0	390	12	549
Rottnest	30·145	30·102	30·469	29·806	69·9	57·5	63·7	84·4	57·5	67·7	57·5	78·0	45·0	401	12	548
Mandurah	...	...	...	...	69·9	48·3	59·1	84·6	37·1	68·3	50·1	80·7	36·5	561	13	709
Marradong	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wandering	...	...	...	...	67·7	47·9	54·8	86·0	31·3	66·3	43·0	76·9	31·1	296	11	551
Narrogin	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Collie	...	...	...	...	68·0	39·5	53·8	87·0	30·5	65·1	41·7	77·4	29·0	487	14	709
Donnybrook	...	...	...	...	68·0	45·0	56·5	83·5	34·0	66·6	46·4	78·1	33·0	594	14	912
Bunbury	30·132	30·116	30·475	29·790	68·9	48·9	58·9	81·2	32·0	68·2	50·8	82·0	36·0	470	14	680
Busselton	...	...	...	...	67·0	46·4	61·7	76·8	34·8	66·5	48·9	77·7	35·2	371	13	555
Cape Naturaliste ...	30·140	..	30·410	29·780	66·4	56·0	61·2	75·5	43·0	...	...	...	...	504	15	821
Bridgetown	...	...	..	...	68·2	41·0	54·6	88·9	31·7	66·0	42·6	81·3	27·6	505	13	792
Karridale	30·095	30·096	30·300	29·610	68·0	50·0	59·0	85·0	39·2	67·3	49·1	88·1	32·5	743	19	1,131
Cape Leeuwin	30·060	30·065	30·440	29·560	68·0	57·0	62·5	85·0	48·0	65·9	56·2	78·8	44·9	697	20	1,112
Katanning	30·145	30·120	30·493	29·818	67·2	43·9	55·6	88·1	34·2	64·9	45·0	79·0	30·5	348	10	608
Mt. Barker	...	..	...	...	65·8	44·9	55·4	85·0	36·9	...	...	...	...	310	13	763
Albany	30·070	30·098	30·408	29·643	69·0	50·8	59·9	86·2	43·2	65·3	49·2	80·0	35·1	549	15	972
Breaksea...	30·080	30·096	30·440	29·620	66·0	54·0	60·0	83·0	45·0	63·9	53·9	78·2	42·1	502	18	991
Esperance	30·132	30·142	30·397	29·720	70·8	48·8	59·4	91·8	39·4	68·1	50·0	86·0	35·0	286	10	699
Balladonia	30·180	30·140	30·462	29·722	69·0	42·6	55·8	85·0	31·1	67·9	47·1	88·2	34·6	72	3	527
Eyre	30·138	30·160	30·417	29·563	72·8	48·0	60·4	86·1	34·0	69·4	49·2	93·5	34·0	164	5	573
INTERSTATE.																
Perth	30·150	30·121	30·479	29·847	71·3	52·7	62·0	90·4	42·1	68·6	52·6	84·0	39·9	518	11	730
Adelaide	30·245	30·149	30·527	29·800	67·0	49·2	58·1	80·7	41·3	65·2	50·0	88·3	36·9	240	11	741
Melbourne	29·245	30·023	30·495	29·860	63·9	46·8	55·4	73·8	39·8	61·4	46·5	82·1	31·3	166	8	748
Sydney	30·260	30·091	30·490	29·770	67·0	52·0	58·5	73·0	46·0	64·8	52·0	83·5	40·2	170	8	1,687

The Observatory, Perth, 12th June, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for April, 1907 (completed as far as possible), and for May, 1907 (principally from Telegraphic Reports).

STATIONS.	APRIL, 1907.		MAY, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham	38	2	2	1
6-Mile	...	...	...	...
Carlton	...	...	...	...
Ivanhoe	...	...	...	...
Argyle Downs	...	...	...	...
Rosewood Downs	...	...	...	...
Lisadell	...	...	...	...
Turkey Creek	23	2	1	1
Ord River	...	...	...	...
Alice Downs	...	...	...	...
Flora Valley	...	...	...	...
Hall's Creek	Nil	...	Nil	...
Nicholson Plains	...	...	..	...
Ruby Plains	...	...	...	...
Denison Downs	...	...	...	...
WEST KIMBERLEY:				
Mt. Barnett	...	...	...	...
Mt. House	93	1	..	...
Leopold Downs	...	...	...	...
Fitzroy Crossing (P.O.)	Nil	...	Nil	...
Fitzroy Station	...	...	...	...
Brooking	...	...	...	...
Cherrabun	Nil	...	...	...
Bohemia Downs	...	...	...	...
Quanbun	...	...	...	...
Nookanbah	Nil	...	..	...
Upper Liveringa	...	...	...	...
Yeeda	...	...	...	...
Derby	Nil	...	Nil	...
Pt. Torment	27	1	...	...
Obagama	6	1	...	...
Beagle Bay	38	3	...	...
Roebuck Downs	Nil	...	...	...
Kimberley Downs	...	...	...	...
Broome	Nil	...	Nil	...
La Grange Bay	Nil	...	Nil	...
N.W. COAST:				
Wallal	Nil	...	Nil	...
Pardoo	...	...	...	...
Condon	Nil	...	Nil	...
DeGrey River	Nil	...	...	...
Port Hedland	Nil	...	Nil	...
Boodarie	...	...	...	...
N.W. COAST—*contd.*				
Whim Creek	Nil	...	Nil	...
Mallina	...	...	...	...
Croydon	...	...	...	...
Sherlock	...	...	...	...
Woodbrooke	...	...	...	...
Cooyapooya	Nil	...	...	...
Roebourne	2	1	Nil	...
Cossack	Nil	...	Nil	...
Fortescue	Nil	...	Nil	...
Mardie	...	...	...	...
Chinginarra	...	...	...	...
Yarraloola	...	...	...	...
Peedamullah	Nil	...	...	...
Onslow	Nil	...	20	1
Point Cloates	5	1	...	...
N.W. INLAND:				
Ethel Creek	...	...	...	...
Warrawagine	Nil	...	...	...
Eel Creek	...	...	...	...
Muccan	...	...	...	...
Ettrick	...	...	..	...
Strelly	3	1	...	...
Mulgie	...	...	...	...
Warralong	...	...	...	...
Coongon	...	...	...	...
Talga	...	...	...	...
Bamboo Creek	Nil	...	Nil	...
Moolyella	...	...	...	...
Marble Bar	Nil	...	Nil	...
Warrawoona	Nil	...	Nil	...
Corunna Downs	...	...	...	...
Mt. Edgar	...	...	...	...
Nullagine	Nil	...	Nil	...
Middle Creek	...	...	...	...
Mosquito Creek	Nil	...	...	...
Roy Hill	...	...	...	...
Bamboo Springs	Nil	...	...	...
Kerdiadary	Nil	...	...	...
Woodstock	Nil	...	...	...
Yandyarra	...	...	...	...
Station Peak	...	...	...	...
Mulga Downs	Nil	...	...	...
Mt. Florence	...	...	...	...
Tambrey	...	...	...	...
Millstream	Nil	...	...	...

RAINFALL—*continued.*

Stations.	April, 1907.		May, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. Inland—*contd.*				
Red Hill ...	...	...	...	...
Mt. Stewart ...	...	...	...	...
Peake Station ...	5	1	...	...
Nanutarra ...	...	...	...	...
Yanrey	...	...	...	...
Wogoola ...	...	...	...	...
Towera	Nil	...	...	...
Gascoyne:				
Winning Pool ...	Nil	...	15	2
Coordalia ...	...	...	...	...
Wandagee ...	Nil	...	...	...
Williambury ...	29	1	...	...
Yanyeareddy ...	...	...	..	...
Maroonah ...	...	...	...	...
Ullawarra ...	Nil	...	...	...
Mt. Mortimer ...	...	...	...	...
Edmunds ...	62	1	...	...
Gifford Creek ...	...	...	...	...
Bangemall ...	...	...	...	...
Upper Clifton Downs	Nil	...	...	...
Clifton Downs ...	...	...	...	...
Mearerbundie ...	19	1	...	...
Byro	10	1	...	...
Meedo	...	...	...	...
Minnie Creek ...	Nil	...	...	...
Bintholya ...	...	...	...	...
Lyon's River ..	Nil	...	...	...
Mangaroon ...	...	...	...	...
Booloogooroo ...	16	1	...	...
Doorawarrah ...	19	2	...	...
Brick House ...	Nil	...	...	...
Boolathana ...	...	...	...	...
Carnarvon ...	Nil	...	47	4
Point Charles ...	34	3	24	4
Dirk Hartog ...	...	...	..	..
Sharks Bay ...	13	2	37	3
Wooramel ...	22	2	65	4
Hamelin Pool ...	7	2	68	5
Kararang ...	15	3	...	...
Tamala	42	2	...	...
Yalgoo District:				
Woolgorong ...	...	...	...	...
New Forest ...	...	...	...	...
Yuin	Nil	...	50	3
Yalgoo District—*contd.*				
Pindathuna ...	Nil	...	...	...
Tallyrang ...	Nil	...	...	...
Mullewa ...	22	3	92	4
Kockatea ...	12	2	124	5
Barnong ...	16	2	86	4
Gullewa	...	...	...	...
Gullewa House...	20	3	65	5
Gabyon	Nil	...	36	3
Mellenbye ...	19	3	41	4
Wearagaminda...	15	2	64	4
Yalgoo	Nil	...	54	3
Wagga Wagga ...	5	1	...	...
Muralgarra ...	24	2	...	...
Burnerbinmah ...	30	5	36	7
Nalbara	7	2	...	...
Wydgee	19	2	...	...
Field's Find ...	28	3	49	5
Thundelarra ...	74	2	44	4
Rothesay ...	...	...	...	...
Ninghan ...	52	2	...	...
Condingnow ...	30	2	...	...
163-Mile ...	Nil	...	...	...
Palaga Rocks ...	...	...	...	...
126-Mile ...	28	3	...	...
90-Mile	...	...	...	...
Mt. Jackson ...	12	3	74	4
Murchison:				
Wale	...	..	...	...
Yallalonga ...	25	1	...	...
Billabalong ...	...	...	...	...
Twin Peaks ...	...	...	...	...
Murgoo	5	1	51	2
Mt. Wittenoom ..	17	1	36	2
Meka	Nil	...	33	2
Wooleane ...	28	1	40	1
Boolardy ...	...	...	..	...
Yederadda ...	8	1	22	2
Woogorong ...	60	1	44	2
Manfred ...	20	2	28	3
Yarra Yarra ...	11	1	61	2
Milly Milly ...	Nil	...	33	2
Berringarra ...	22	2	23	1
Mileura	...	...	...	...
Mt. Gould ...	20	1	30	1
Moorarie ...	...	...	...	...
Peak Hill ...	Nil	...	39	2
Minderoo ...	...	...	...	...
Abbotts	Nil	...	40	1
Belele	...	...	...	...

RAINFALL—*continued.*

STATIONS.	APRIL, 1907.		MAY, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
MURCHISON—*contd.*				
Gabanintha	Nil	...	27	3
Bungalow	Nil	...	33	2
Quinns	...	...	...	...
Nannine	3	1	27	2
Annean	Nil	...	...	...
Tuckanarra	12	1	53	3
Coodardy	42	1	...	...
Cue	21	2	6	2
Day Dawn	20	1	13	2
Lake Austin	4	1	13	2
Lennonville	Nil	...	26	2
Mt. Magnet	10	1	37	3
Youeragabbie	...	...	39	2
Murrum	Nil	...	85	3
Challa	13	2	19	2
Nunngarra	6	1	46	3
Berrigrin	Nil	...	...	...
EAST MURCHISON:				
Gum Creek	6	1	...	..
Dural	Nil	...	...	..
Wiluna	Nil	...	48	1
Mt. Sir Samuel	Nil	...	37	2
Leinster	.	...	...	...
Lawlers	Nil	...	70	2
Wilson's Patch	Nil	...	71	2
Lake Darlôt	Nil	...	43	2
Darda	Nil	..	27	2
Salt Soak	...	...	..	...
Duketon	Nil	...	...	..
Erlistoun	Nil	...	89	2
NORTH COOLGARDIE GOLDFIELDS:				
Laverton	Nil	...	63	2
Mt. Morgans	Nil	...	57	2
Murrin Murrin	12	1	68	2
Mt. Malcolm	3	1	89	2
Mt. Leonora	2	1	68	2
Tampa	Nil	...	69	2
Kookynie	Nil	...	64	2
Niagara	Nil	...	45	2
Yerilla	...	...	...	...
Yundamindera	Nil	...	67	2
Mt. Celia	Nil	...	...	...
Edjudina	5	1	...	...
Quandinnie	14	1	...	...
Menzies	Nil	...	25	2
Mulline	12	1	108	4
Mulwarrie	22	1	107	3
Goongarrie	Nil	...	106	3
COOLGARDIE GOLDFIELDS:				
Waverley	25	1	85	2
Bardoc	14	1	141	4
Broad Arrow	Nil	...	129	5
Kanowna	2	2	163	4
Kurnalpi	Nil	...	138	3
Bulong	Nil	...	144	4
Kalgoorlie	6	1	131	4
Coolgardie	Nil	..	128	8
Burbanks	5	1	96	5
Bulla Bulling	19	1	120	5
Woolubar	Nil	...	63	2
Waterdale	33	1	107	6
Widgiemooltha	37	3	75	8
15-Mile Condenser	21	1	58	5
50-Mile	26	2	...	...
Norseman	20	2	76	8
Lake View	31	1	63	5
Frazer Range		...	...	...
Southern Hills	...	..	...	...
YILGARN GOLDFIELDS:				
129-Mile	...	..	...	...
Emu Rocks	25	2	89	6
56-Mile	...	...	...	...
Glenelg Rocks	17	2	116	5
Burracoppin	20	1	114	5
Bodallin	22	1	69	2
Parker's Road	...	...	...	...
Southern Cross	16	2	62	5
Parker's Range	25	4	...	...
Yellowdine	20	1	74	4
Karalee	20	2	80	3
Koorarawalyee	21	2	82	6
Boorabbin	10	1	67	5
Boondi	11	2	63	6
SOUTH-WEST (NORTHERN DIVISION):				
Murchison House	30	3	131	7
Mt. View	18	3	71	8
Mumby	85	4	140	9
Willow Gully	34	4	311	12
Northampton	49	3	208	6
Chapman Experimental Farm	26	1	231	9
Narratarra	...	...	...	...

RAINFALL—*continued.*

Stations.	April, 1907.		May, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (NORTHERN DIVISION)—*contd.*				
Oakabella ...	46	4	333	10
White Peak ...	61	4	298	11
Geraldton ...	44	5	349	12
Hinton Farm ...	...	...	...	..
Tibradden ...	...	...	..	.
Myaree	90	5	237	11
Sand Springs ...	...	..	...	...
Nangetty ...	46	4	149	7
Greenough ...	46	4	310	9
Bokara	30	4	358	11
Dongara ...	54	3	315	11
Strawberry ...	86	5	331	9
Yaragadee ...	51	5	110	5
Urella	70	5	163	7
Opawa	44	5	151	9
Manara	59	5	166	10
Mingenew ...	59	6	234	10
Yandenooka ...	41	2	210	8
Arrino	43	2	254	5
Three Springs ...	69	5	237	10
Carnamah ...	88	5	292	9
Jun Jun	69	3	190	7
Watheroo ...	31	3	278	9
Nergaminon ...	43	5	264	8
Dandaragan ...	58	4	401	9
Yatheroo ...	...	...	...	...
Moora	50	4	252	8
Walebing ...	41	4	302	9
Round Hill ...	25	4	243	9
New Norcia ...	39	4	319	10
Wongon Hills ...	59	4	226	8
Wannamel ...	50	3	400	9
Gingin	44	3	566	9
SOUTH-WEST (METROPOLITAN):				
Wanneroo ...	111	3	506	10
Belvoir	145	8	516	9
Wandu	157	8	499	11
Mundaring ...	131	8	716	10
Canning Waterworks	119	4	598	12
Kalbyamba ...	116	4	482	10
Guildford ...	159	3	402	11
Perth Gardens ...	96	8	524	11
Perth Observatory	111	8	518	11
Highgate Hill ...	135	8	542	11
Subiaco	133	8	477	11
SOUTH-WEST (METROPOLITAN)—*cont.*				
Fremantle ...	56	6	390	12
Rottnest	54	3	401	12
Rockingham ...	96	4	636	12
Jandakot ...	72	2	681	8
Armadale ...	64	3	450	13
Jarrahdale ...	140	3	722	12
Jarrahdale (Norie)	120	3	...	...
Serpentine ...	92	2	600	12
EXTREME SOUTH-WEST:				
Mandurah ...	93	5	561	13
Pinjarra (Blythewood)	101	3	433	10
Pinjarra ...	75	3	562	9
Upper Murray ...	60	5	...	...
Yarloop	92	4	686	13
Harvey	66	4	568	13
Brunswick ...	103	2	672	11
Collie	88	2	487	14
Glen Mervyn ...	108	2	506	9
Donnybrook ...	83	3	594	14
Boyanup ...	99	5	...	...
Bunbury ...	63	3	470	14
Elgin	64	4	484	14
Busselton ...	43	5	371	13
Quindalup ...	70	4	619	15
Cape Naturaliste	79	5	504	15
Glen Lossie ...	85	2	570	16
Karridale ...	75	6	743	19
Cape Leeuwin ...	85	8	697	20
Lower Blackwood	65	1	565	9
Ferndale ...	70	3	544	13
Greenbushes ...	69	3	591	12
Cooeearup ...	56	4	596	16
Bridgetown ...	57	4	505	13
Hilton	50	2	452	9
Greenfields ...	56	3	407	9
Dunninup ...	59	2	...	...
Cundinup ...	28	1	359	8
Wilgarrup ...	77	6	552	13
Balbarrup ...	82	8	554	10
Bidellia ...	81	3	408	8
Westbourne ...	66	7	467	13
Deeside	76	4	476	9
Riverside ...	91	5	477	12
Mordalup ...	67	4	366	8
Lake Muir ...	89	6	...	...

RAINFALL—*continued.*

STATIONS.	APRIL, 1907.		MAY, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN AGRICULTURAL DISTRICTS:				
Walgo	25	2	278	10
Dowerin	14	2	151	6
Baker's Hill	70	2	291	7
Hatherley	21	2	...	...
Momberkine	21	2	201	4
Bolgart	...	...	...	...
Eumalga	27	3	451	11
Newcastle	12	2	324	11
Craiglands	106	2	563	10
Eadine	69	3	381	11
Northam	21	3	291	8
Grass Valley	21	1	231	5
Cobham	43	3	290	9
York	64	3	294	10
Burrayocking	34	3	287	7
Meckering	20	1	195	8
Cunderdin	29	2	196	7
Doongin	34	1	172	7
Whitehaven	34	1	240	6
Mt. Caroline	20	1	203	8
Cutenning	30	3	154	7
Kellerberrin	38	3	155	5
Cardonia	24	3	155	6
Baandee	23	1	127	6
Nangeenan	27	2	129	5
Merredin	26	1	115	5
Codg-Codgen	26	3	116	6
Mangowine	62	2	123	8
Yarragin	17	1	124	5
Wattoning	...	...	..	...
Koomberkyne	27	3	206	9
GREAT SOUTHERN RAILWAY LINE:				
Dalebridge	83	2	268	6
Beverley	66	3	394	7
Brookton	23	2	327	7
Sunning Hill	11	2	329	10
Pingelly	16	2	283	11
Yornaning	26	2	281	11
Narrogin	48	2	290	9
Narrogin State Farm	64	2	290	8
Rose Hill	57	2	216	7
Wagin	35	3	260	9
Katanning	41	2	348	10
Sunnyside	24	2	289	7
Broomehill	22	2	350	9
GREAT SOUTHERN RAILWAY LINE—*contd.*				
Woodyarrup	33	3	323	10
Pallinup	18	2	198	7
Tambellup	12	4	286	9
Toolbrunup	16	2	276	9
Cranbrook	43	6	346	12
Stirling View	25	4	306	12
Kendenup	54	5	294	12
Woogenellup	21	5	...	...
Woodburn	97	3	...	...
St. Werburgh's	64	9	320	15
Mt. Barker	55	6	310	13
WEST OF GREAT SOUTHERN RAILWAY LINE:				
Talbot House	86	2	306	8
Jelcobine	29	2	347	10
Bannister	46	2	...	...
Wandering	44	3	296	11
Glen Ern	22	2	323	11
Marradong	71	2	439	10
Wonnaminta	41	2	...	...
Williams	52	2	244	10
Rifle Downs	58	2	461	7
Darkan	...	...	...	...
Arthur River	37	2	320	8
Gainsborough	31	2	198	9
Glenorchy	45	2	326	6
Kojonup	15	3	466	9
Blackwattle	36	3	...	...
Warriup	38	10	380	13
Forest Hill	79	7	338	14
EAST OF GREAT SOUTHERN RAILWAY LINE:				
Sunset Hills	65	3	...	...
Oakdale	80	3	286	7
Barrington	69	2	278	8
Bally Bally	77	3	...	...
Stock Hill	31	2	335	6
Qualin	64	2	363	8
Woodgreen	63	3	235	7
Glenallan	33	1	333	9
Gillimanning	15	2	...	...

RAINFALL—*continued.*

Stations.	April, 1907.		May, 1907.	
	No. of Points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
East of Great Southern Railway Line—*contd.*				
Wickepin	...	...	...	...
Crooked Pool	46	2	...	...
Nallyring	47	2	223	8
Yardup	23	2	264	10
Bunking	47	2	186	6
Bullock Hills	39	2	..	...
Dyliabing	44	3	253	11
Glencove	43	2	288	10
Cherillalup	39	2	.	...
Strathavon	27	2	241	10
Woolganup	15	1	335	10
Chillinup	16	2	...	...
Jarramongup	9	1	...	...
Uberin	29	2	205	7
South Coast:				
Wilson's Inlet	116	6	483	17
Grasmere	126	8	525	14
King River	103	6	440	11
Albany	101	7	549	15
Point King	116	3	509	13
Breaksea	119	14	502	18
Cape Riche	36	3	393	10
South Coast—*contd.*				
Peppermint Grove	62	6	479	9
Bremer Bay	99	4	550	8
Coconarup	61	4	137	7
Ravensthorpe	34	6	172	10
Cowjanup	...	...	...	...
Hopetoun	63	4	339	6
Fanny's Cove	90	2	...	...
Park Farm	80	3	...	...
Grass Patch	28	1	...	...
Swan Lagoon	45	4	...	...
30-Mile	54	4	...	...
Gibson's Soak	97	4	...	...
Myrup	100	5	292	7
Esperance	131	8	286	10
Boyatup	112	6	...	...
Lynburn	66	4	...	...
Cape Arid	52	4	..	...
Point Malcolm	48	8	171	11
Israelite Bay	26	6	88	8
Nannambinia	13	1	...	...
Balbinia	17	1	..	...
Balladonia	16	3	72	3
Eyre	4	2	164	5
Mundrabella	...	...	..	...
Eucla	6	6	51	4

The Observatory, Perth,
12th June, 1907.

W. E. COOKE,
Government Astronomer.

By Authority: Fred. Wm. Simpson, Government Printer, Perth.

JOURNAL

OF THE

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OF

WESTERN AUSTRALIA.

Vol. XV. JULY, 1907. Part 7.

NOTES.

Subscriptions.—It is notified that subscribers who have not yet paid their annual subscriptions for the current year will be struck off the postal list after the publication of this issue.

Show Fixtures.—Elsewhere in this issue will be found a list of the annual show fixtures approved of by the committee recently appointed under the supervision of the Royal Agricultural Society. It will be seen that the National Show has been fixed for October the 1st and 2nd, and not the 24th as stated in a paragraph in the last issue of the *Journal.*

Agricultural Exhibits.—The Department of Agriculture is frequently making up exhibits for exhibitions in London and elsewhere. The Under Secretary will be pleased to hear from growers who have any special products of fruit, grain, or anything else worth exhibiting. The same will be either shown in the grower's name or purchased by the Department for exhibition purposes.

Dairy Co-operation.—Great strides in the formation of co-operations of dairymen are being made in various parts of the Commonwealth; in no place, however, is more activity shown in this respect than in Queensland. Butter factories and creameries are being established throughout that State, no less than four being opened for operations during June, and in each case these building have been erected by farmers and dairymen's co-operation.

Cowpeas for Feeding.—Besides making the best green manure, cowpeas is equal, when made into hay, to either corn or oats. As a milk producer it is one of the best feeds for dairy cattle. To those who have not grown a crop of this valuable legume, we would strongly urge them to sow a few acres as soon as possible, and feel sure that once they are tried the cultivation of the cowpea plot will be one of the regular annual undertakings.

Spraying Potatoes.—From experiments just completed at a large experimental station in another State, it has been amply demonstrated that potato plants sprayed once gave an additional yield of 12 cwt. to the acre, those sprayed twice 15 cwt., and those sprayed three times 17 cwt. to the acre. The best times to spray was found to be: 1st, when 6 inches high; 2nd and 3rd applications at an interval of a fortnight or three weeks, according to the weather.

Patato Catalogue.—We have received from Messrs. Gardner Bros, a copy of their new potato catalogue entitled "Potatoes for Profit." It contains illustrations of four famous potatoes, the "Up-to-Date," "Factor," "Manhattan," and "King Edward VII." The plates are reproductions of actual photographs taken from seed in Messrs. Gardner Bros. warehouse, the same basket being used for each kind a comparison is easily made between them. The catalogue also contains a long list of other good potatoes, besides valuable cultivation notes.

Shelter for Horses and Cattle.—Owing to the mild climate existing in this State very little thought is given towards providing shelter for horses and cattle during the prevalence of winter rains. This is not as it should be, and the erection of a few cheap shelters under which animals could find protection during heavy downpours will be found to well repay both the cost of material and labour expended on the erection. Many a good horse has been lost through a cold settling on the kidneys owing to exposure, and cows have frequently been known to fall off in milk yield through the same cause.

Stud Sheep for Western Australia.—J. M. Peck and Sons, Melbourne, report having sold by private contract, on account of Mr. D. M. Aitken, late of Gleniffer, Scoresby, the whole of his stud flock of Shropshire ewes to Mr. Samuel P. McKay, of Western Australia, owing to Mr. Aitken having sold his properties. Mr. Aitken's flock was widely known as one of the best-bred and highest-class stud flocks of Shropshires in Victoria, every one of his original ewes having been bred by Andrew E. Mansell, and purchased at his dispersion sale at Harrington Hall, Shropshire, in 1901, and all rams used in the stud since its formation have been of Mansell blood. Mr. Aitken was the judge of the Shropshire sheep at the last show held at Claremont.

Feeding Horses on Bread.—Bread, once the staple food of horses in England, is still used in some parts of Europe. Veterinary-Colonel Nunn, remarking on the condition of a mare behind which he was travelling in Switzerland, was told by the driver that her condition was due to the ration of bread which, he said, was given to all working horses in the Engadine. This bread is made in long loaves, the usual foreign shape, from third-class rye flour, they are baked as hard as a brick, and are perfectly dry, the people holding that dry bread is more digestible and also keeps longer. The coachmen give their horses 1lb. of bread in the morning, and a feed of bread when halting to bait; hay and oats are given as well. Two pounds of this rye bread is considered equal to about 3lb. of oats, but the bread is more expensive than oats.

Skim Milk as a Fertilizer.—Skim milk as a fertilizer for crops is interesting the farmers in the vicinity of Halsey, N.J. (says an American exchange), and several declare that astonishing results have followed its use. Several weeks ago a creamery of that place had a lot of skim milk that could not be sold. W. Clark Mains and John A. Segier, farmers, took the milk and poured it on their lands as an experiment. Mains emptied 75 cans on a timothy sod lot. Segier emptied 150 cans on a piece of meadow land. Remarkable results are said to have been obtained. Their grass is now seven times as vigorous as on adjoining fields where the milk was not used, but which were covered with commercial fertilizers. The farmers predict that milk will be used henceforth.

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Manuring Potatoes.—A light dressing of farmyard manure, in conjunction with a suitable dressing of artificial manures, is capable of producing larger and more profitable crops than that produced by farmyard manure alone. A dressing of artificial manures used in conjunction with farmyard manure should contain the three constituents, nitrogen, phosphates, and potash. Where no farmyard manure is obtainable, large and profitable crops of potatoes can be grown with the aid of a "complete" mixture of artificial manures, *i.e.*, supplying nitrogen, phosphates, and potash. The sulphate of potash and muriate of potash have given practically equal yields, but muriate of potash is at present the cheaper manure. The effect of the manures is chiefly seen in the weight of large tubers produced. The weight of diseased tubers is less on those plots dressed with artificial manures only than on those dressed with farmyard manure.

Mule Breeding.—In the year 1689 a law was enacted in France whereby it was forbidden to put a stallion ass to any mare of less than 14 hands in height, the object of this being to maintain the production of fine mules. Mule-breeders held that to breed good mules the mare should be under ten years old, and reserved their large "full-bodied" mares for this purpose. It was preferred that the mares should be of the same colour as the ass, especially when it was desired to produce the black mule, which was not readily sold. Experts judged the height to which the young mules might be expected to grow by the length of their legs. "At three months the legs have attained their full growth, and they are then half the height of the mule" when full-grown. The colts were taken in hand to be broken when three years old; their breaking and training required much more patience than horses, "because they are much more headstrong and fanatical." The practice was to tie one foot up to the thigh to prevent them from kicking, and make them docile. They were sometimes dosed with wine to "familiarise" them, or make them quiet.

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Regulations as to Introduction of Fruit, etc., into South Australia.—Exporters and others are notified that the South Australian Government has issued fresh regulations prohibiting the introduction into South Australia of guava, persimmon, tomato, cucumber, passion-vine, peach, apricot, plum, or any of the citrus family into South Australia from any country or State where any insect known as the fruit-fly is known to exist, unless accompanied by a declaration signed by a Government inspector employed by that country or State to the following effect, that is to

say—(*a*), that the said fruit is free from fruit-fly ; (*b*), that no fruit-fly is known to exist within 20 miles of the garden in which such fruit was grown. No fruit or other product of any tree or plant shall be landed on any wharf jetty, or other structure in the State of South Australia without the written permission of an inspector first obtained. A copy of the regulations may be seen at the Department of Agriculture, Perth.

Hops.—A parcel of hops grown at the Experimental Farm, Hamel, was recently sent to the Manager of the Swan Brewery Co. for his opinion. In acknowledging the receipts of the hops, Mr. T. Hardwick said:—"It gives me pleasure to state that, with a single defect (to which I will refer later), the hops are a very good sample, and show evidence of careful and correct treatment. In my opinion their market value is one shilling per pound, delivered at my Company's brewery, and if you have any on hand at the present time, I would be quite willing to take them at that price, subject, of course, to the bulk opening up equal to the sample received. The hops have been damaged somewhat by exposure to the wind (this is the defect above referred to, and was doubtless caused owing to the absence of an efficient wind break), and I would suggest that steps be taken to prevent a similar complaint in future years." With reference to the foregoing, it is pleasing to note that already quite a number of settlers have turned their attention to this industry. It may therefore be within the range of the near future to meet the total requirements of this State with the local grown article.

Dairy Feeds.—A practical and successful dairyman gives in the *Jersey Bulletin* his plan of feeding the cows. We make ensilage our main food, he says. It is unnecessary to enlarge upon the value of ensilage, for every dairyman certainly knows the value of this great feed. We feed from 30lb. to 40lb. of ensilage per day, in proportion to the cow. In the winter the ensilage is not removed from the silo until feeding time, and is fed steaming hot. The ensilage ration is balanced with bran and hay. The bran is fed in proportion to the period of lactation of the cow, and as much as she will consume at a profit. We feed our ensilage and bran the first thing in the morning; then do our milking and separating; then feed as much hay as the cow will clean up before noon. The same method is followed in the evening, feeding hay the last thing at night. If we have no ensilage we plant a small plot of sweet corn early in the spring and begin feeding as soon as it is up, cutting from the field and hauling to the pasture each day. This is a more expensive way of feeding than the ensilage, but is far better than letting the cows go hungry, for a hungry cow will not give milk. Our cows must have all they want to eat 365 days each year.

Mr. Compere's Work Appreciated.—The interest that is taken in America in the work that has been performed by Mr. George Compere, the entomologist of the Department of Agriculture in this State, is shown by the following paragraph which appeared in the San Francisco *Weekly Chronicle* of May 22nd last:—"It is understood that State Horticultural Commissioner Ellwood Cooper, whose term is about to expire—or perhaps has expired—does not desire a reappointment, but does desire that either Alexander Craw or George Compere may be his successor, in order that the work of combating insects by parasites may be carried on under the most intelligent direction. Mr. Craw is in Hawaii, under a five-years' contract, of which we do not think more than two years have expired. Mr. Compere is also, presumably, under contract with one or two countries, but probably not for any very long term. Mr. Cooper, we believe, desires to be continued in office until one of the two gentlemen named is available. And it ought to be so. So much money has been spent on the introduction of parasites, and so much good has been accomplished, that it would be very unwise to get a successor to Mr. Cooper who will not continue to push the work. The technical skill and experience of Mr. Craw or Mr. Compere would also be of great value in the directing official."

Apples for England.—One of the London dailies in reviewing the importation of apples says that the Nova Scotian season now concluding has not been altogether of a satisfactory nature—the apples have been of rather small size and of poor keeping quality. The supplies of apples from the Antipodes have, up to the present season, been derived from Tasmania, Victoria, and South Australia ; but this year marks a new development in the Colonial apple trade, viz., the shipping of apples to England from Western Australia. Although a "handful" may have occasionally arrived here from that quarter, from a practical point of view Fremantle may be said to commence its apple exporting in 1907. Tasmanians were the first apples from the Antipodes to be shipped to England, those from Victoria not commencing until about the year 1895 ; nor did they make much headway until 1899, when they were brought prominently before the public through the medium of the "Greater Britain" exhibition of that year. Since then they have met with the popular appreciation their excellent quality amply justifies. The shipments from Tasmania this year are estimated to reach close on 500,000 cases.

White Ants in Fruit Trees.—A correspondent on the Eastern Goldfields writes complaining that some of his fruit trees had been attacked by white ants, and asked for a remedy. The matter was referred to Mr. Newman, of the Entomological Department, who replied to the query as follows :—"One of the simplest methods of treating the white ant is with Quibell's mixture, applied at the rate of one part of the mixture to 15 parts of water, less if the tree be tender. Earth the soil up around the stem, to about four inches (form this into a basin or hollow on top) and pour into this a small quantity of the mixture, say, a small bucketful to a dozen trees, less if the tree be naturally tender. When this has soaked into the ground cover the soil up in which the mixture has been placed. This mixture can be obtained from any of the wholesale chemists in Perth, such as Messrs. Faulding & Co., Murray Street, or Messrs. Felton, Grimwade, and Bickford, Wellington Street, and also from Wm. Sandover & Co. Another simple remedy is the usual poison bait used for cut worms, which is made up of the following:—1oz. Paris green, 3lb. of flour, and 3oz. of sugar mixed into a stiff dough and placed in holes near the stem of the attacked trees and covered with a shingle or any flat substance to exclude the light. The insects eat this mixture and die, and are eaten by their fellow insects, who are also poisoned and die."

Slugs and Snails.—Complaints have reached the Department of Agriculture of the prevalence of snails and slugs in gardens, they have caused considerable havoc by destroying all young and tender plants. As this is a pest that, with a little care, can be prevented from doing very great harm, efforts should be made to destroy them. If neglected they will soon be come a scourge and a serious menace. The following remedies are recommended by Mr. Despeissis in his "Handbook on Horticulture":—Tobacco decoction, made by boiling 1lb. of home-grown tobacco or waste with 1lb. soft soap in 6 gallons of water, strain and use at intervals of two or three days, wherever the pests are found feeding. Tobacco powder sprinkled over the plants, quicklime or ashes round beds; traps, consisting of arsenisated cabbage leaves spread over the ground; thin boards covered with films of grease or rancid butter attract many at night; pick and destroy. Powdered kainit mixed with quicklime dusted over the plants when the dark comes and the slugs are feeding, kills a great many. Ducks are also good scavengers, and will answer for the destruction of a good many if allowed the run of the garden.

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An Important Discovery in Insect Life.—Mr. G. Compere, Entomologist to this State, in the course of a report says:—"By the successful importation into this State from California of the three species of parasites of the soft brown scale, *Lecanium hesperidum*, and the grape scale, *Lecanium cymbiform,* will tend to clear up an entomological mystery in California; in that State there is a scale, *Lecanium armeniacum*, which attacks the apricot trees. and was at one time a serious pest in that State. Some years ago Mr. Ehrharn, now Deputy State Commissioner, discovered its parasite, *Comys fusca.* This parasite has been distributed to all sections of the State where the scale is known to exist, and has now for years kept it far below the danger line. But where, or in what form, the parasite hibernates has always remained a mystery. In seaching for the soft brown and grape scale parasites in California last January the same difficulty was experienced. there were no parasites found hibernating in any form, and I made up my mind to bring along some cuttings containing the very young scale larvæ, which at the time showed absolutely no traces of the presence of any parasites upon the material; but soon after it was received in this State, and placed in breeding cages, Mr. Newman noticed that a large number of the young larvæ contained a single parasite in each, and in a short time they began to issue, and in turn would oviposite in the remaining half-grown and adult scale, in which they have since reproduced themselves, and as many as twenty-nine exit holes have been noticed in a single scale This shows that these parasites have the extraordinary faculty of being able to destroy both the tiny larvæ and adult scales, and that they hibernate in the egg form. And this will also prove to be the case with the apricot scale parasite in California."

Fruit Fly Parasites.—On the 23rd inst. Mr. Compere will leave again for the Orient to continue his mission in quest of the natural enemies of the fruit fly. It will be rembered that Mr. Compere left the State for Asia last May, but when he arrived at the place where the parasites are to be obtained, found that the season there was much too early, and fruit which usually carry fruit fly maggots in that country were not yet ripe, and would not be for at least another six weeks, and having in the meantime discovered some very valuable red scale parasites, he concluded to return with them in person, as we have great need of them in this State. Having delivered the red scale parasites here in good condition he will leave again on the 23rd of the present month to collect the fruit fly parasites. It must not be thought that Mr. Compere is going in the dark with reference to the parasites of the fruit fly, for he has long since discovered them, and has landed them alive in this State on several occasions, but the great difficulty has been our season being just the opposite of that where the parasites are to be obtained, and the time of receiving the former sendings of parasites always found us without maggots upon which to liberate them. To overcome this difficulty of opposite seasons, it is the intention of the Department to establish a breeding station at some place in the Straits Settlements, where a supply of cucumber maggots can be obtained all the year round, and bred the fruit fly parasites until such time as we have plenty of fruit fly maggots here upon which to liberate them.

Points of a Draught Horse.—The points of the physical structure of a horse, on which the most, indeed the whole, of his utility depends are his legs; without his locomotors all the rest, however beautiful it may be, is worth nothing; therefore to those we look first. The shoulder should be long, obliquely set, with a considerable slope, high in the withers, the upper arm should be very long and muscular, the knee broad, flat, and bony, the shank or cannon bone as short as may be, flat, not too round, with clean, firm sinews, the pastern joints moderately long and oblique, but not too much so, the hoofs firm, erect or deep, as opposed to flat, and the feet generally large and sound. We also think that a horse should be perpendicular from his hock down to the ground, so that you may pass a straight-edge from his hip to the ground, touching the points of hock and pastern, forming a perpendicular, and getting the exact height of his hip; then place the straight-edge in front of his fore leg, and you should have a little greater height at the withers than at the hip. You should take the height at the hip as the average height, and then pass your straight-edge from top to rear, perpendicular measurement, and pass it horizontally to the front perpendicular line, and if you have a square, or as near a square as possible, you have an animal that is not clumsy, whether he weighs 1,000lbs. or a ton, as he is a well-balanced horse. If this rule is kept in mind, you will soon be able to detect the good and the bad points with the naked eye.

Smut in Sorghum.—From experiments made to prevent smut in sorghum and Kaffir-corn, a decision has been arrived at that the formaldehyde treatment is the best. In a bulletin published by the Kansas State Agricultural College on the subject, the following remarks appear:—"The most common smut of the cultivated sorghums is what is known as "grain smut," caused by a fungus allied to the smut of corn, and which grows entirely within the tissues of the plant, becoming externally evident and most active in the flowering head, where it consumes the food material intended for seed formation. At maturity the affected heads considerably resemble normal

heads in appearance, but in the interior the seed kernels are almost entirely replaced by a mass of olive-brown, dusty 'spores,' the reproductive bodies of the fungus. These spores germinate when the seeds are planted, sending forth slender germ tubes, which infect the young germinating grain by growing into the delicate tissues. Within the host plant, the fungus consists of very minute, slender threads, the mycelium, which penetrate all the soft parts of the growing stem. The results of the activity of the fungus do not become manifest until the head appears. The injury done lies in the destruction of the developing seed, and (in sorghum) in the reduction of the sugar content of the stalk. The Jensen hot-water treatment of the seed has been found effective, but it is cumbersome and inconvenient of application. Experiments this season, conducted by the Botanical Department of the Experiment Station, indicate that formaldehyde is an effective means of prevention when the smutted seed is soaked for twelve hours in a solution of one-fifth of one per cent. of formaldehyde in water (one pint of formaldehyde to sixty-two gallons three pints of water), or for two hours in a solution of one-half of one per cent. of formaldehyde in water (two pints of formaldehyde to forty-nine gallons three quarts of water)."

New Fodder Grass.—A circular letter has been received from the Secretary of the Victoria Premier Fodder Coy., 168 Flinders Street, Melbourne, offering for sale seed of the "King Island Mellilot" or "Pea Clover." It is stated that it grows most prolifically on King Island, to the height of six feet. It has small yellow flowers with Shamrock-shaped leaves. Has a strong coumarin flavour, like newly mown hay, especially when seeding. It is eaten greedily,by horses, cattle, sheep, and pigs, all of which fatten quickly upon it. Bees are fond of it, as it is very rich in honey. This plant is one of the best of the nitrogen fixing ones and makes the land richer, especially good for green manuring. It is able to grow on very poor land and enriches it. It is triennial and maintains itself easily when established. The *Age*, referring to this plant, stated:—"Reference was recently made to the mellilot, a plant which has grown all over King Island and proved to be a wonderful fodder plant. It is a variety of lucerne, that comes from Southern Europe. The Director of Agriculture for Victoria has received a letter stating that Mr. J. James, of Colac, has tried it on his horses with great success. Another report states that on a farm at Gunbower, on the Murray, there is a paddock of 100 acres of mellilot, and the farmer finds that he can keep more stock on it than on a corresponding area of lucerne. Mr. Cole, of Colac, has also made first-class ensilage from it. A few years ago King Island was a desolate place, occupied by a few fishermen, woodcutters, etc. A syndicate leased it for cattle raising. In consequence of a poisonous plant growing there among the grasses, the catle died off, and it was abandoned. Later on a Sweedish vessel was wrecked on the coast, and among the wreckage washed ashore were mattrasses stuffed with fibre containing seed ; as this decayed the said plant grew, killing out the poisonous weed, and overspread the island. Now it has a population of 600 souls, and exports to Launceston fifty head of fat cattle weekly. An American expert, professor of botany, declares that a fully developed plant of this order conveys to the soil more than four pounds of nitrogen."

The Rabbit Pest.—Reference has been made at different times to the apathy displayed by the average settler as regards the destruction of rabbits on their holdings. Even after the visit of a rabbit inspector to a farm or station where rabbits have been found, and notice in writing has been given to the occupant, in many cases no action has been taken. There is no denying the fact that rabbits have got ahead of the No. 1 fence, but at present they are few in number, and if each settler in the State does his duty and keeps constantly destroying them, there is no reason why they should ever become a pest. But unless everyone takes his fair share of the work and keeps at it continually, it is only a matter of time till the rabbits will overrun this State, as they have done in the East. While some people are doing all they can to cope with the pest, there are others who are not adopting such active measures, and the Minister of Agriculture is determined to use the powers given him by the Rabbit Act to, as far as possible, make every person do his share. It may not be generally known that roads boards are responsible for the keeping down of rabbits on the reserves under their control, but such provision is contained in the Rabbit Act. In accordance with the provisions of this measure, the Minister for Agriculture (Mr. Mitchell) summoned a number of settlers and a secretary of a roads board to appear before him this week to answer a charge of having neglected to carry out the instructions issued to them by rabbit inspectors to destroy rabbits. Those who put in an appearance were duly cautioned, and as this was the first time that this portion of the Act had been put in force, no further steps were taken. In future, however, prosecutions will follow. The secretary of the roads board wrote stating that his board were under the impression that they had no power to spend their funds in so doing, but it having been pointed out that the Rabbit Act gave them the necessary power, the board consented to carry out all such instructions in the future, and the attendance of the secretary was excused. In the case of those who did not obey the Minister's summons and attend, immediate steps are being taken to put men on to destory rabbits on their holdings at the owner's expense, and the cost of so doing becomes a charge upon the land, bearing interest at the rate of 5 per cent. This means that, if the charges and costs are not paid, that charge remains on the land, and if the land is sold, the person who purchases it will incur the responsibility of the debt, so that any land upon which such charges and costs remain unpaid cannot be sold as free from all encumbrances.

POULTRY NOTES.

REPORT ON THE FIRST SUBIACO EGG-LAYING COMPETITION.

By FRANK H. ROBERTSON.

The second egg-laying competition in this State came to a successful conclusion on the 30th of June last at the Government Grounds, Subiaco, and is celebrated on account of the record-breaking scores made by both the winning pens of fowls and ducks. In the former the output of 1,494 eggs in the 12 months from the six Sunnyhurst birds constitutes a record which beats all previous competitions, the former highest being 1,481 from Langshans at the last Hawkesbury Competition. The four Indian Runner ducks owned by R. A. Dusting, have also laid the remarkable number of 1,067 eggs, which is also a higher average than that reached by any other similar competition, and is even a greater average than that reached by the fowls ; the 12 months' average per duck being 269.25 against the hen's 249.

The Subiaco Competition was really an over-flow event arising from the fact that the recently completed Narrogin Competition fell so far short of the demand that it required 64 pens to meet the urgent requests of poultry breeders.

The Locality

in which the competition pens were erected is in every way suitable, and eminently conducive to a profuse egg yield, as the records appended eloquently testify. The ground is pure sand, located in a well sheltered position, but unfortunately the pens were denuded of more of the natural growth than was necessary, the consequence was that artificial shade had to be made by means of boughs.

The Houses and Runs

were made in a most substantial manner, and strong enough to last a lifetime. The wire netting is six feet high, and an extra piece of inch mesh netting, two feet high, is fixed along the bottom between each run to prevent the cock birds from fighting. This proved quite effectual, and was much cheaper than wood or iron. The area of each run is 17 feet by 40 feet. The houses themselves were all iron, extra large, open front on facing the East, and placed sideways in each run, in a handy position close to the entrance gate.

For nest boxes two butter-boxes only were used with front and side knocked out. The hens laid on the sand, and neither straw or nest-eggs were used.

The Management of the Birds

was in the hands of Mr. George Allman (and one assistant, E. Davis). He was selected from a number of local applicants by the Advisory Committee elected from the competing owners, and that their choice was a good one the excellent results amply testify. The writer, as a rule, made monthly inspections, but latterly these had to be made less frequently owing to other duties occupying my attention.

The Feeding

presents no remarkable features, plain food and plenty of it being the system. The fowls were fed in the morning with a warm mash made of bran, pollard, and lucerne chaff, to which was added the poultry meal made by the Queensland Meat Export Company ; also occasionally a little oil-cake. The evening feed was wheat, occasionally mixed with stout oats ; maize and barley were very seldom used. The mode of preparing the mash was to pour boiling hot water on the required quantity of chaff and meat meal, first adding a little salt, then cover up with sacks and leave all night to steam in a wooden tub, next morning mix in the bran and pollard. The quantities of the component parts of the mash varied considerably, also their consistency; this mode being adopted so as to afford the birds a variety. For instance, the mash would be made very dry and crumbly for a few days, and then a very moist one would be introduced. Another change would be to make the mash with very little bran, and so on. The feed was placed in flat-bottomed, round tins, a very liberal supply being given. About half an hour afterwards any food remaining was taken away.

The quantities eaten varied considerably. No set rule can be laid down in this respect. Green feed, when available, was fed at mid-day, but lucerne chaff adequately took the place of fresh green feed. It serves a very useful purpose to the poultry breeders of this State, but becomes rather expensive, as it is all imported from the Eastern States at a cost of about £10 a ton. Surely some local farmers can be found to produce what we want. Some two or three years ago I drew attention to this demand, but as yet it has not been responded to. Grit in the shape of shell and crushed blue metal was always before the hens, thrown in once a week at the back end of the pens.

The Duck Feeding

was rather different to the fowls, the materials of the mash were the same but differently apportioned and served moister, and, as a rule, consisted of about equal parts of bran, pollard, and lucerne chaff, with always a little oil-cake added to the morning meal; they also got more meat meal than the hens, and some fresh green feed was given at mid-day in the hot weather. A tin of shell grit was always before the ducks, of which they consumed a great quantity. The birds had as much as they would eat at the morning feed, but in the evening they were given an extra supply, and had some left over which was eaten during the night or early morning. The only time hard feed was given would be when a pen was off their feed, they were then fed sparingly on wheat served in the water tin, and they soon recovered their appetite.

Cost of Feed.

From the undermentioned statement of quantities of food consumed it will be seen that the cost of feeding the fowls comes out at 6s. 10d. per head, and the ducks 1s. 0½d. more. The ducks do not compare favourably as regards cost of feed owing to the smaller price realised by duck eggs. But the receipts from sales of eggs show very high figures, the leading pen's eggs being worth £9 2s. 5½d.

The appended list of quantities and cost of feed is of interest to both poultry and duck breeders, and shows in plain figures the difference between duck and fowl feeding :—

Quantity and Cost of Food.

Fowls.					Ducks.				
		£	s.	d.			£	s.	d.
Pollard ...	842 bushels	49	2	0	Pollard ...	301 bushels	17	17	0
Bran ..	120 „	7	0	5	Bran ...	88 „	5	2	0
Wheat ..	208 „	37	11	0	Oil-cake ...	5 cwt.	2	0	0
Oats ...	67 „	12	13	11	Lucerne and Chaff	8 „	4	0	0
Oil-cake ...	7 cwt.	2	16	6	Meat ...	770 lbs.	6	12	0
Lucerne ...	22 „	11	0	0	Grit ..	20½ cwt.	4	13	0
Barley ...	9½ „	4	6	1	Salt .	½ „	0	2	0
Maize ...	3 „	2	6	3	Green Stuff	...	1	1	1
Meat ...	1,586 lbs.	13	4	5					
Green Stuff	...	2	3	0					
Grit ...	18 cwt.	4	0	0					
Salt	½ „	0	2	0					
		£146	5	7			£41	7	1

428 Head: Cost per head, 6s. 10d. *105 Head:* Cost per head, 7s. 10½·09d.

The Duck Pens

were in two rows and very small, only 12 feet square, and made of two feet wire netting, except a six feet corner in each run, of iron, with one six foot sheet of iron overhead. There was no tree shelter in any of these pens, but good bough shade was erected in the hot weather. Each run was provided with a gate to allow the birds to get to their bath, which was kept in about half a-dozen square tins placed in the lanes in small wired-in enclosures, about half an hour being allowed to each lot in turn. The runs were cleaned every few weeks, dug up, and fresh sand put in ; and from the splendid egg yield produced it is evident ducks do well in very small pens.

Male Birds in the Pens.

This evidently had no bad effect on the egg yield, as about half the number of pens were mated, among them being the first six in hens, and the 1st, 3rd, 4th, and 5th in ducks. But at times, especially before hens came on to lay after the moult, the cock bird became a worry to some of the hens, and in such cases his absence is to be preferred.

The General Health

of the birds was splendid, always looking bright and well. Seventeen hens died, viz., five from excessive heat, five ovarian troubles, two distended crops, one accidental, one internal tumours, three colds; but it is very satisfactory to note that none of the first eight pens required a replaced bird. The losses were mostly in the pens low down on the record list.

Various Items of Interest.

Broody fowls were a great worry. They were taken off the nests every night when collecting the eggs, and placed in runs or in coops with slatted floors. Only four (4) pens out of the whole 64 did not have brooders, and one day during February 77 hens were out of the pens. A great many of the Leghorns wanted to sit, even one of the Sunnyhurst hens went broody, but a single day's absence from the run put her off. A remarkable thing about this pen was that they quite upset the old proverb about the "Early bird catching the worm," as they were always the first to go to roost at night, and the last off in the morning.

The public have of late taken a prejudice against duck eggs, which do not sell nearly as well as hen eggs. This is remarkable, as I understand one sells as well as the other in the Eastern States.

A large number of eggs were sold for setting purposes, with varying results, some persons being very lucky, others quite the reverse ; and yet when the private breeder sells eggs which do not hatch well, he too often gets a rough time of it from the buyer.

As a rule the small, bright active types of hens proved the best layers, and the heavy birds did not keep up their name for good winter laying.

A better average egg yield would probably have been recorded had the competition commenced two or three months earlier, as a moult would have thus been avoided in most instances, still, with some fowls, moulting made but little difference to their egg output ; other good layers stopped dead when in moult.

Ducks moult oftener than fowls, as most of them had two full moults (several had partial moults in addition), and Sargenfri three. The two leading pens went right through wothout a moult.

Comparing the egg yield of this competition with the Narrogin one it will be seen that the total averages are very close per bird, viz., 159.85 for Subiaco against 158.53, equal to 1 and one-third egg per bird more for Subiaco, and taking individual pens, leaving out the two imported lots from South Australia, we find that Ranford's winning Brown Leghorns at Narrogin laid 200 eggs more than any others of the same variety at Subiaco, and are only 21 eggs behind Craig's birds, third at Subiaco. In Silver Wyandottes, Padman's (Subiaco) only laid five more eggs than Neitschke's (Narrogin). Then, taking worst records, the lowest at Narrogin was 719 ; there were four pens lower than that at Subiaco.

The following is the full record and list of prize-winners, but there are still a few details to place before the public, and on account of extra work entailed in preparing reports and returns for the end of the Financial Year, some will have to be held over until next month's *Journal.*

RESULT OF EGG-LAYING COMPETITION.

[Commenced on July 1, 1906. Closed on June 30, 1907.]

FOWLS.

Six hens in each pen.

Owner and Breed.	June.	Total.	Market Value.			Average per hen.	Weight of Eggs.	
			£	s.	d.		ozs.	drs.
1. Sunnyhurst (S.A.), *W. Leghorn ...	60	1,494	9	2	5½	249	22	15
2. A. H. Padman (S.A.), *W. Leghorn ...	58	1,335	8	0	6¼	222·5	23	10
3. S. Craig, *W. Leghorn	56	1,301	7	17	2¾	216·83	22	3½
4. Ericville Egg Farm, *W. Leghorn ...	36	1,247	7	12	11¼	207 83	23	0
5. A. H. Padman (S.A.), *S. Wyandotte	47	1,198	7	6	0¾	199·67	22	1
6. J. D. Smith, *W. Leghorn	31	1,169	6	19	4½	194·83	24	14
7. E. Garbett, W. Leghorn	15	1,169	6	19	9¼	194·83	22	10
8. G. W. G. Lizars, *W. Leghorn ...	14	1,138	6	15	1	189·67	25	2
9. Austin and Thomas, W. Leghorns ...	0	1,134	6	14	10	189	24	0
10. E. Fitzgerald, W. Leghorn	11	1,131	6	14	4½	188 5	24	0
11. Mrs. McGree, *W. Leghorn	25	1,126	6	18	2¾	187·67	24	1
12. E. Palmerston, W. Leghorn	2	1,111	6	10	0¼	185·17	24	0
13. F. Piaggio, W. Leghorn	13	1,107	6	12	1½	184·5	24	0
14. G. M. Buttsworth, *W. Leghorn ...	14	1,079	6	9	0¾	179·83	22	12
15. Bungalow Farm, Brown Leghorn ...	8	1,078	6	6	2¾	179·67	22	11
16. Adelaide Yard, W. Leghorn	21	1,076	6	10	5¾	179·33	25	0
17. J. R. Parkes, Brown Leghorn ...	0	1,072	6	4	5	178·67	24	4
18. Ryan Bros., *W. Leghorn	9	1,072	6	2	11	178 67	24	12
19. Bon Accord, W. Leghorn	4	1,068	6	4	11	178	24	6
20. A. F. Farrant, Partridge Wyandotte	45	1,065	6	5	3¼	177·5	22	1
21. J. W. Buttsworth, *W. Leghorn ...	16	1,058	6	6	5¼	176·33	24	10
22. F. Whitfield, Brown Leghorn ...	0	1,020	5	14	3	170	24	10
23. A. S. B. Craig, *W. Wyandotte ...	38	1,005	6	14	2¾	167·5	20	7
24. F. T. Rowe, *Black Orpington ...	6	1,004	5	19	5¾	167·33	26	14
25. L. Meatchem, *G. Wyandotte ...	56	987	6	2	1½	164·5	22	0
26. B. Jones, *S. Wyandotte	55	983	6	1	8¼	163·83	24	4
27. Bungalow Farm, *W. Leghorn ...	22	983	5	14	9	163·83	23	0
28. W. J. Clarke, Brown Leghorn ...	18	979	5	7	1½	163·17	21	14
29. C. W. Johnson, *W. Leghorn... ...	3	975	5	11	0½	162·5	24	4
30. E. Hutchinson, *Minorcas	8	955	5	13	10	159·17	28	9
31. R. G. Smith, W. Wyandotte	58	951	5	19	3	158 5	22	15
32. H. M. Kelley, *G. Wyandotte ...	4	947	5	14	1¼	157·83	21	6
33. Mrs. Hughes, *R. C. B. Leghorn ...	23	940	5	8	11¾	156·67	22	5
34. F. Whitfield, *W. Leghorn	0	933	5	7	9¼	155·5	24	11
35. C. L. Braddock, S. Wyandotte ...	70	929	5	16	1	154·83	23	4
36. W. Attwell, *S. Wyandotte	24	929	5	9	10½	154·83	21	12
37. W. Wade, W. Leghorn	8	926	5	10	6	154·33	24	12
38. W. Snowden, Brown Leghorn ...	5	917	5	1	6	152·83	22	8
39. J. W. Buttsworth, S. Wyandotte ...	45	912	5	12	0	152·0	23	0
40. Perth Yard, W. Leghorn	21	900	5	7	4¼	150·0	25	6
41. Glen Donald Yard, G. Wyandotte ...	39	886	5	8	8¾	147·67	21	6
42. O. K. Yard, *Black Orpington ...	0	884	5	3	5¼	147·33	24	12
43. W. Snowden, S. Wyandotte	27	862	5	6	5	143·67	23	11
44. Honnor and Forbes, R. C., W. Leghorn	30	852	5	0	4	142·0	24	0
45. Geo. Bolger, *Black Orpington ...	3	848	4	19	2	141·33	25	5
46. H. Jones, W. Leghorn	12	835	4	11	5¾	139·17	24	6
47. A. Snell, *Brown Leghorn	11	831	4	9	3	138·5	22	3
48. A. R. Keesing, Minorcas	0	826	4	10	7	137·66	28	2
49. E. A. Newton, W. Leghorn	9	825	4	15	10	137·5	25	8
50. R. G. Flynn, W. Leghorn	0	825	4	12	6¾	137·5	23	13
51. C. R. Roberts, *W. Leghorn	0	820	4	13	1	136·67	27	10
52. Mrs. McGree, W. Wyandotte... ...	24	813	4	19	2¾	135·5	23	11

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* Male birds were placed in these pens on August 1.

FOWLS—*continued.*

Owner and Breed.	June.	Total.	Market Value.			Average per hen.	Weight for eggs.	
			£	s.	d.		ozs.	drs.
53. J. White, Brown Leghorn	0	798	4	5	0¾	138 0	22	15
54. Jas. Kirk, G. Wyandotte	44	793	4	17	9¾	132 17	23	7
55. A. Coombs, S. Wyandotte	18	783	4	11	11¼	130·5	23	6
56. F. Mason, W. Leghorn...	2	775	4	8	6	129·17	23	12
57. J. S. Miller, S. Wyandotte	14	762	4	9	4¼	127·0	22	8
58. Ericville Farm, *Black Orpington ...	12	751	4	1	4¾	125·17	28	10
59. H. H. Wegg, G. Wyandotte	37	751	4	9	11¾	125·17	21	12
60. J. B. Pettit, S. Wyandotte	51	737	4	9	7	122·83	22	0
61. J. E. Redman, S. Wyandotte	17	711	4	3	9½	118·5	22	13
62. C. Crawley, B. Orpington	0	705	3	15	3½	117·5	24	9
63. H. M. Kelley, *B. Orpington	0	675	3	13	8¼	112 5	24	11
64. A. Savage, Minorca	0	632	3	7	6¼	105·33	32	0
Total	1,294	61,383	...			...	...	

* Male birds were placed in these pens on August 1.

DUCKS.

Four in each Pen.

Owner and breed.	June.	Total.	Market value.			Average per duck.	Weight of eggs.	
			£	s.	d.		oz.	drs.
1. R. A. Dusting, *Indian Runner ...	57	1,067	5	13	11½	266·75	27	2
2 Adelaide Poultry Yard, Indian Runner	62	928	4	19	5	232·	29	13
3. Ericville Egg Farm, *Buff Orpington	85	918	5	0	4¼	228·35	30	0
4. D. F. Vincent, *Indian Runner ...	42	897	4	15	10	224·25	25	8
5. Bon Accord, *Buff Orpington ...	88	895	4	18	4	223·75	30	6
6. Austin and Thomas, *Indian Runner	31	867	4	8	6¼	216·75	28	8
7. F. T. Rowe, Indian Runner	67	865	4	8	11¼	216·25	28	6
8. A. Snell, *Indian Runner	80	824	4	3	7½	206·	29	6
9. Miss E. Parker, Indian Runner ...	55	821	4	3	0	205·25	27	14
10. E. A. Newton, Indian Runner ...	70	819	4	5	9½	204·75	29	2
11. Aveley Poultry Yard, Indian Runner	54	808	4	5	1¾	202·	29	12
12. S. Craig, Indian Runner	66	790	4	4	5	197·5	29	6
13. C. E. Close, Indian Runner	65	771	3	16	7¼	192·75	31	4
14. Perth Poultry Yard, *Buff Orpington	32	759	4	1	8¾	189·75	31	2
15. G. Stead, *Indian Runner	27	758	4	0	8	189·5	30	0
16. C. W. Johnson, *Indian Runner ...	30	748	3	17	8½	187·	29	0
17. W. Snowden, *Buff Orpington ...	71	740	3	17	8	185·	30	0
18. Mrs. Mellen, *Indian Runner	66	728	3	13	8	182·	29	2
19. J. B. Pettit, Indian Runner	55	709	3	13	10½	177·25	29	0
20. F. Piaggio, Buff Orpington	·75	685	3	10	6¾	171 25	30	0
21. Sargenfri (S.A.), *Buff Orpington ...	59	624	3	6	1¼	156·	30	14
22. J. R. Parkes, Indian Runner	0	611	2	19	10	151·75	28	2
Totals	1,237	17,627	...			...	...	

Male birds were placed in these pens on August 1.

The prizes for greatest number of eggs during the twelve months were won as follows:—Fowls.—First, Sunnyhurst; second, A. H. Padman (W.L.); third, S. Craig; fourth, Ericville Farm; fifth, A. H. Padman (S.W.); tied for sixth, E. Garbett and J. D. Smith. *Ducks.*—**First, R. A. Dusting; second, Adelaide Yard; third, Ericville; fourth, D. F. Vincent; fifth, Bon Accord; sixth, Austin and Thomas.**

The following prizes have also been awarded:—Monthly prize of £1: *Fowls.*—1st month, Sunnyhurst, White Leghorns, 139 eggs; 2nd month, A. F. Farrant, Partridge Wyandottes, 159 eggs; third month, Sunnyhurst, White Leghorns, 150 eggs; 4th month, Sunnyhurst, 160 eggs; 5th month, Sunnyhurst, White Leghorns, 140 eggs; 6th month, Ryan Bros., White Leghorns, 147 eggs; 7th month, Sunnyhurst, 129 eggs; 8th month, Sunnyhurst, White Leghorns, 129 eggs; 9th month, E. Palmerston, White Leghorns, 127 eggs; 10th month, Sunnyhurst, White Leghorns, 106 eggs; 11th month, R. G. Smith, White Wyandottes, 87 eggs; 12th month, C. L. Braddock, Silver Wyandottes, 70 eggs. *Ducks.*—1st month, R. A. Dusting, Indian Runners, 64 eggs; 2nd month, E. A. Newton, and R. A. Dusting, equal, both Indian Runners, 116 each; 3rd month, R. A. Dusting, C. E. Close, and S. Craig, equal, 120 each; 4th month, A. Snell and Adelaide Poultry Yard, 103 each; 5th month, Miss Parker and F. D. Vincent, 106 each; 6th month, R. A. Dusting, 115; 7th month, R. A. Dusting, 111 eggs; 8th month, D. F. Vincent, 91; 9th month, D. F. Vincent, 99; 10th month, Ericville, Buff Orpingtons, 90; 11th month, Ericville, Buff Orpingtons, 85 eggs; 12th month, Bon Accord, Buff Orpingtons, 88.

Prizes for first three months (Winter test).—*Fowls.*—1st prize, £3, Sunnyhurst (S.A.), White Leghorns, 429 eggs; 2nd prize, £2, J. D. Smith, White Leghorns, 388 eggs; 3rd prize, £1, A. H. Padman (S.A.), White Leghorns, 380 eggs. *Ducks.*—1st prize, £3, R. A. Dusting, Indian Runners, 300 eggs; 2nd prize, £2, E. A. Newton, Indian Runners, 272 eggs; 3rd prize, £1, Mrs. L. Mellen, Indian Runners, 263 eggs.

Prizes for greatest number of eggs during last three months:—*Fowls.*—First prize, £3, Sunnyhurst, 239. *Ducks.*—First prize, Ericville, Buff Orpington, 260.

Last 3 months Test (Hens).

Sunnyhurst, 1st	239
R. G. Smith, 2nd	226
L. Meatchem, 3rd	212

Last 3 months (Ducks).

Ericville, 1st	260
Bon Accord, 2nd	245
Adelaide P. Y., 3rd	188

NOTES ABOUT DUCKS.

Most ducks, when they stop laying, don't start again till they have a moult, but Dusting's used to spell and go on again as strong as ever. The highest totals were put up in September and October. In the former month three pens (Dusting, Craig, and Close) put up the possible 120 eggs each in 30 days, and in the latter month two pens (Adelaide Poultry Yard and Snell) were one short, 123 in 31 days; all these pens are Runners.

SUBIACO EGG-LAYING COMPETITION.

(1) Sunnyhurst White Leghorns (Champions) 1,494 eggs laid in 12 months.
(2) Mr. A. H Padman's White Leghorns (Second place) 1,335 eggs laid in 12 months

Dusting's pen got going right from the start and stopped there all the time. Their highest total was the possible in September, their lowest, 58, in May. This is truly a miraculous pen, as in addition to their being such great layers, they are a splendid show type of duck.

Adelaide Poultry Yard birds did not lay during the first month, but laid very consistently after.

Vincent's pen only laid two eggs the first month, and eight the second ; but put in seven months' big laying. They had two full months.

Austin and Thomas' laid well during first seven months.

Rowe's pen shared with Dusting's in being the best type of Runner, and their laying was even better than their record shows. During the months of September, October, and November they only missed six eggs in 84 days ; their record was 38 days without missing an egg.

Ericville and Bon Accord Buffs laid real well, and came very strong during the last few months, the former winning monthly prizes besides gaining the winter test.

Johnson's pen of Runners were of good type and colour, but they were too old to give good laying results.

Sargenfri Buffs were fine, large handsome birds, but did not do as well as anticipated. They had three full months.

The Runners averaged per duck, 16 pens,. The Buffs averaged per duck, six pens.

As far as appearances go the Buffs were better from a show point of view than the Runners, some of which were very poor specimens of the breed, the drakes in particular.

NOTES ABOUT THE FOWLS.

Of the 64 pens 28 were White Leghorns, and 17 of these were in the first 20. Many types of the breed were represented, but most of the good layers were found to be the small, active birds. Some of the pens proved a great disappointment, as, by the look of the birds, we expected them to do a lot better ; can't pick a layer by its looks.

Sunnyhurst pen jumped off the mark right from the start and kept there right through the Competition. They put up their highest total in October, 160 eggs, which was the greatest number laid by any pen during the year. This was a grand team of birds. They kept well right through the test, and only slackened down in their laying during the last month. They were very big eaters, and very active birds.

The second pen, Padman's, were also a splendid team, and for months were very close to the winners. Their highest was also in October, 151. They were a better looking pen than the winners, and laid a larger egg. During the whole of the Competition they did not lay an egg that we would have rejected for hatching purposes. Their lowest month was April, 72 eggs, and they finished well and strong.

The third pen (S. Craig) led all the other W.A. birds, and laid very even right through. A couple of months back it looked as if they were sure to be second, as they were creeping up to Padman. At the end of

April they were only four eggs behind him, but they went into moult and eased off, and Padman's kept on.

Pen four, Erickville, laid well right through, but came with a great dash during the last three or four months. They are a small, handsome bird, and very active, and lay a good egg.

Garbett, Smith, Lizars, Austin and Thomas, all kept up amongst the top pens, and are all good birds.

Fitzgerald, Johnson, Whitfield, Adelaide Poultry Yard, Roberts' were all very large birds, big eaters, and laid very large eggs.

Palmerston. These were the smallest whites in Competition, good eaters, and laid a very large egg, and were very active birds ; laid remarkably well during the summer months ; won the March prize ; did their best laying when they were quite bare of feathers; started to moult in December; started feathering in April, and then stopped dead.

McGrees.—This pen was not too good in health. A couple of the hens were often ailing, otherwise they would have had a better record ; but they were good layers.

Bon Accord were much like Palmerston's, a small, active bird, good eaters, and layers of a good egg.

Piaggio, Wade, H. Jones, Flynn, Perth, Newton, Bungalow, were all good looking birds, and small eaters. The first-named laid well right through Jones' were the first Leghorns to get through the moult, but they did not start laying again until a couple of weeks before the finish.

Ryan Bros.' were a good looking team, and won the December test with 147 eggs. Went into moult early, and stopped laying ; very active birds and good eaters.

Buttsworth, 2 pens.—Were about the same in laying, the one, his own breeding, slightly the better.

Mason.—A very handsome show pen.

Brown Leghorns.

Clarke's.—A very nice pen of birds, good layers, very active, and very small eaters.

Bungalow.—The same.

White.—A nice pen, very small eaters, but hardly an egg during last three months.

Snell.—Very active ; big eaters.

Snowden's pen.—Altogether too old.

Whitfield.—Think they would have done a lot better had they been younger birds.

All the Brown Leghorns stopped during the last couple of months.

Mrs. Hughes.—This was the only R.C.B. in the Competition. A very nice pen, and they laid a good egg. It is a pity they were old birds. Had they been younger their total would have been much higher. They laid throughout the year, and were the smallest eaters in the yard.

Honnor and Forbes, R. C. White's.—Also very small eaters. A very nice pen, but did not seem to have stamina enough to run a Competition through. Was very doubtful of them putting through the summer, but they gave us no trouble. They laid right through the year.

Minorcas.

Only three pens. Two of these have been bred too much for show. Keesing's were a splendid pen of show birds.

Hutchinson's were small, and they proved that the old type of Minorcas can still lay.

Savage's laid the largest egg in Competition.

Wyandottes.

Partridge.—Farrant's pen were the only ones in, and, by the way they started off, we expected great things from them. During first two weeks they only laid nine eggs, but finished up the month with 82. Won the second month with 159, but after that they were always broody.

Silvers.—None of the Wyandottes did anything of note, excepting going broody. Padman's headed all others of the breed. It looked as if they would have gone higher on the list as they laid well right through the summer, but they broke up during the last two months. They were fine big birds but not show specimens. Attwell and Jones' were the best laced birds and laid fairly well. The same may be said of Buttsworth's. None of the others laid at all well, excepting Braddock's, which laid well during the first three months and finished well. Pettit's team were last on the list for many months but laid better towards the finish.

Only three pens of Whites, the leaders, Craig, going over 1,000 eggs. Smith's, a very nice even pen, winning the monthly prize in May, with 87 eggs. McGree's, also a nice pen of show birds, were very small eaters. Craig's were good doers.

Golden.—There were several pens of this handsome breed from show yards, and some of the birds were more fit for the show than a laying competition. Kelley's were a fine, large, well-coloured bird and laid real well during the summer months, but contrary to expectations broke down when the cold weather set in.

Glendonald was also a show pen, and laid very even right through. Meatchem's, though not such a good-looking bird, laid very well right through. Wegg's pen, a lovely lot of hens, also show birds, and Kirk's did not do well.

Orpington.

The Black Orpingtons were very disappointing, as at no time did they lay up to expectations, and during the last few months we hardly got an egg from them. They are without a doubt the biggest eaters in the place, and taken as a whole, the worst fowls for broodiness. But still they should be a good fowl for the farmer to take up, for they are such a fine large bird and should find a ready sale for market purposes; and perhaps, kept under different conditions, may lay a lot better than they have done with us. Rowe's were the exception, and did well.

Mr. S. Craig's Poultry Farm at Belmont.

A little over two years ago I paid a visit to Mr Craig's place, and described same in the *Journal* for May, 1905, and before describing my recent visit it will be of interest to look back to my former notes to compare the progress of events.

Mr. Craig has been settled in this locality for the past 12 years, and has brought to perfection a first-class market garden, which has yielded him a very nice income. Fowls he has always kept, but it is only of late years that they have received his serious attention. On my first visit about 500 head were raised, but last season's breeding probably produced four times that number ; anyhow everything has been greatly increased and enlarged. The first stock to meet the eye were the ducks, all Indian Runners, of good type and appearance, and good layers, being Dusting's and Snell's strain. There is a good crowd of them, contained in nine runs, each about 80ft. x 160ft., 25 ducks and five drakes in each. There is not a particle of shelter against rain and cold, but they are kept in a shady locality in hot weather. Water is laid on to these runs by pipes resting on the surface, and when one drinking spot gets sloppy the pipes are shifted on a few feet. Eight fig trees are planted in each run, and they each in turn receive the benefit of the water. The ducks are fed chiefly on bran and pollard mashes, to which is added a liberal supply of chaffed green lucerne which is grown on the farm. Grain at mid-day, and no meat, but owing to the low prices duck eggs fetched during the past season, Mr. Craig is thinking of giving them up.

Crossing a lane the opposite side to the duck pens is a six-acre paddock in which the natural tree shelter remains untouched. The laying pullets are kept here ; all white leghorns, running in lots of 50. There are 18 runs, each one chain by three chains, a fowl-house 7ft. x 16ft. is in each run, facing the East with open front. The perches contrary to usual custom are made high enough to allow of a man getting under them for cleaning out. A small ladder is provided for the birds to reach the roosts. Mr. Craig says " fowls like high perches and why not give them what they like," certainly they are light birds, the soil is soft, and they have plenty of room to fly so as to alight gently on the ground, therefore bumble foot is not likely to occur under such conditions. A very handy and simple arrangement is made for nest boxes. Four upright posts are put in the ground to make a stand about four feet high, on this raised platform rests a row of butter boxes in which the eggs are laid, thus making collecting an easy matter. The space between the uprights is wired in, and makes a good place in which to put broodyhens which are not required for setting. Passing from this paddock we come to the breeding pens of which there are nine, each 27ft. x 80. There is ample natural shade here, and the houses are similar to the others but smaller. These contain the cream of Mr. Craig's stock, and that he can breed good layers is proved by his birds scoring third place at the Subiaco competition just finished; his pen, however, did not return home, but were sold on the last day of the competition for £15. At the auction sale £11 was bid for them and refused, but were sold privately later on the same afternoon.

All the chickens are reared by hens, no incubators being in use, the hens are set two in each little run, which are located under an open shed ; food and water is always before them, and the birds come off and go on at their own sweet will. The chickens are reared by hens, empty packing cases are used to keep the hens in, one side and bottom knocked out and front covered with wire netting. During the height of the breeding season a great lot of cases are called into use, and are scattered over a large area of ground. The feed used being chiefly crushed wheat.

Water is supplied from a well, a handy little oil engine doing the pumping, also chaff-cutting, etc. There is nothing of a fanciful or elaborate nature about the poultry runs, rough posts, six feet wire netting, and cheap second-hand corrugated iron for the houses; it serves the purpose just as well as the brand new article, and does not cost quarter the money. Mr. Craig does not go in for showing; eggs for the table being the chief source of profit, and as his eggs top the market, and he gets plenty of them, poultry breeding pays better than vegetable growing, and Mr. Craig only regrets he did not pay more attention to it sooner than he did.

All the poultry feed is bought except greenstuff, and those people who have their doubts about poultry raising being made to pay, should pay Mr. Craig's place a visit and see for themselves.

FRUIT AND POULTRY COMBINED.

By Wm. H. Robinson, La Fayette, Ind.

Fruit and poultry growing together make an excellent combination, each being a decided help to the other, and the two being productive of both pleasure and profit. I shall tell from practical experience what common folk such as I can do, and I hope it will prove interesting and beneficial especially to beginners.

From close study and my everyday work among them I have learned that poultry in the orchard is of the greatest advantage to all the fruit there. The fowls are constantly at work over the orchard at the base of the trees, on the hunt for worms and all kinds of insect life. The soil will need less cultivation for it will be found that the constant stirring of the ground by the chicks will bring excellent results to the trees, and that they will practically rid the orchard of the insect pests that are the enemies of the fruit-grower.

The great benefit of the poultry droppings to the orchard is not so generally known as it should be. I have trees that have doubled their yields from this cause, and I know other farmers and fruit-growers who have doubled their crops from trees which before would bear very irregularly or every other season and then give only a small crop of knotty fruit. Now these trees bear annually large crops of sound fruit, the abundant fruiting being principally due to the increased fertility of the soil caused by the poultry droppings, which in my opinion is the strongest fertiliser that can be used for fruit or garden. It must also be remembered that the trees, particularly those of an old orchard, must be kept in fruiting condition by proper pruning and the thinning out of all surplus wood thus admitting an abundance of sunlight and air to the trees and fruit from all sides.

The shade of the trees is a decided benefit to the chicks in hot weather, for here in the orchard they can roam far or near in the shade or in the sunlight as they please, searching for worms and insects and eating the fresh green grass at will. In my opinion nature furnishes no better place for poultry than the orchard. Allow them free range from colony coops and in return they will work havoc with the annually large crop of insect enemies of the fruit-grower, without expense or trouble to him.

Spraying the Trees.

The spraying of fruit trees may well be mentioned here. While, as a general thing, I think all orchards should be sprayed if we wish fruit, yet I have found from experience that where my poultry works the best a far less amount of spraying is needed and so a lot of extra work is saved. Your chicks will work daily and sooner or later they will get a large part of what you spray to kill, with benefit to themselves. Besides the excellent food and exercise they get they are all the while working and manuring the soil to an appreciable extent.

An important thing to remember is that because trees are not sprayed at the proper time, thousands of bees are killed every season by the poisoning of the bloom too soon. Many bee-keepers have learned this to their sorrow. If a colony of growing chicks is housed among the trees they will look after a very large per cent. of the harmful insects and they are constantly on duty ready for any new arrival of any new variety of insect life that may appear. And while they are busy at work around the bases of your trees, a colony of bees may be as busily working and reaping their sweet harvest from the bloom above.

A word should be said in the interest of the bees if they are located near the poultry. Their hives must be some distance from the poultry house or set on stands high enough so that the chickens cannot reach them, or the chicks will eat the bees. This is one variety of insect life that does not agree with chickens, for after they are swallowed the bees will sting the chicken and are often the unsuspected cause of its death. If you breed pure-bred stock you can not afford to risk your promising chicks. To save both chicks and bees, set the stands higher or stake a small piece of wire netting around the hives.

I do not advise you to cease spraying altogether, for experience teaches us that sprayed trees bear better fruit, but I do assert that trees that have the most attention from your poultry will need the least amount of spraying and work, and I should feel safe in guaranteeing that you will have fruit and plenty of it, much more than can be obtained from an orchard that never sees a chick or fowl.

Colony Houses.

In order to describe my method and the kind of colony house to use, I can do no better than to give my everyday experience. When a mother hen and her chicks are ready to be taken from the nest, if a colony coop is not already properly located, I take a horse and draw one to the orchard or alongside a berry patch or perhaps to the ends of the rows, being careful that it is not in the way so that the cultivator cannot pass in giving the berries the best of cultivation. Here, in a colony coop which can be made of different sizes as your lumber permits by anyone with a few tools and nails, the flock makes its home.

Most of my houses are about six to ten feet long, about five feet wide, five and one-half feet high in front and four and one-half in the back, with a tight board floor and a large window close to the floor made to slide open if desired. A door is placed conveniently in one end near the front. Cover the roof with a good felt roofing and the sides and ends with Neponset or something equally as good, to prevent all draughts. Place a piece of small mesh wire netting over the window opening and make an extra door of the same, to keep out night visitors. Above all things keep the houses clean.

A basketful of good, dry clover chaff from the mow is scattered over the floor. Avoid straw if it is full of sharp hulls as they are injurious to young chicks. I place the hen under a slated coop or loose in the house if she is very gentle. On the floor is a drinking fountain full of clean, fresh water, and small, dry grains, and plenty of grit are scattered in the litter which will induce exercise at once. Here in the sunlight, by the closed or open window as the weather permits, they can work to their hearts' content, and strong, hardy fowls are the result.

When large enough to run out on warm, spring days, open a small door in the front of the coop and you will see how quickly they will learn to go out, nip the young grass and newly sprouted weeds, running in and out the berry rows, now in the shade, now in the sunlight, indulging in a general game of hide and seek for worms and insects of every description. And all the while they are adding to the fertility of the soil and increasing the coming berry crop. This aid with the proper trimming and cultivation of the canes, gives us the fine, large berries that bring top prices and that establishes your reputation as the producer of first class fruit.

On the other hand, with dry feeding (which I claim is the proper method of feeding) with free range in the fruit orchard or berry fields, with a proper house that is kept clean and dry, it is but little trouble to start the chicks right and grow them to strong, vigorous fowls for utility stock or for prize winners.

Care of the Older Chicks.

As the chicks become larger or at weaning time, you must take the hen away and leave the entire space for the little ones, remembering always that the house must be kept clean and dry. The chicks will cling to this home and cannot be driven away unless too many are crowded into one house in which event they will take to the trees. Or, if you wish, a larger house may be drawn far out in the orchard or it may be placed "under the shade of the old apple tree."

Protect yourself against thieves in the form of hawks, animal enemies, and human thieves by providing the house with a good lock on the door and heavy wire netting over the window opening. Then with a Scotch Collie dog and above all a good shot gun, you will be in shape to repel all attacks from these enemies of poultry culture. The Collie can be trained to chase the hawks and the gun may prove of use either day or night.

Place the well-started chicks in the larger house, providing them with plenty of clean, dry litter on the floor. Do not be in a hurry to put in roosts nor place them too high when you do introduce them or the chicks will have crooked breast bones. Supply them with fresh, clean water and their dry food hopper. It may be well to confine them for a few days in a yard made of four-foot wire netting held in place by stakes, until they become accustomed to their new home. Then remove the fence and give them their liberty and watch results. You will be surprised and pleased with their rapid growth.

Many of these colony houses, plainly but substantially made, can be used to great advantage during the growing season. Each lot of chicks will cling to its home unless crowded out, as I said before. When sudden showers come the chicks scamper to their homes without any urging. It is "home" and they will stay there till they are matured birds ready for winter quarters.

This free access to a grass range and liberty to roam and hunt the orchard and fields for worms and insects, not only gives your poultry that born-to-live, prosperous, business-like appearance and keeps them free from most of the ills that affect poultry, but it also gives to your strain a constitutional vigour hard to equal where birds are kept in confinement. And it is a case of reciprocity. Your orchard and berry fields are reaping great benefit from the presence of the poultry in return for the shelter and food they furnish the growing chicks.

The Professors who know about such things, tell us that chicks and hens must have the proper chemical elements of meat and bone in order to build bone, muscle, and feathers and to insure a large egg yield. We hear much about "protein" these days. My birds are abundantly supplied with it in the insects that they eat in the orchard and fields. Do you wonder why your fowls go crazy when they see a nice fat worm come crawling into sight, or why they chase a juicy bug, miller or grass-hopper across your fruit place? They are after the "protein," and they will get it.

We may not approve of the taste of the chicks as they swallow the various insects with the cluck of satisfaction, but the more we learn of "henology" and the growing of fancy fruits and berries, the more thankful we are for the appetite Mother Nature gave them, and the more firmly we believe it is not only a splendid thing for them, but it is a grand, good thing for the fruit-grower as well for them to get everything in the way of "protein" that comes in sight, and to have them stir and dig the soil for what is not in sight, in short, the more "protein" they get the better for them and the better for the fruit.

A little study of Nature's common-sense methods oft times solves big problems. Therefore, I strongly advise the use of suitable movable colony houses in the orchard and groups of strong, business chicks to occupy them. If you have any doubts try it as the writer has these many years. Keep your eyes open, watch results, and you will soon be convinced of the excellence of the plan.

I submit two photographs of houses in use on our place. In one the window is rather small and too high from the floor for the best results. The other shows the style of house that we are building now. This one is built on runners and is ready for the wire over the window and the paper on the sides. The door is in the end. This house is being built near my workshop under the pines and maples, and is almost ready to take its place in the orchard.

I hope for the good of their pocket-books that many poultrymen will soon become convinced of the profits to be gained by raising poultry and choice fruits together.

SUBIACO EGG-LAYING COMPETITION

(3) Mr S Craig's White Leghorns (Third place) 1 301 eggs laid in 12 months (4) General view of the fowl pens (5) Mr R A Dusting's Indian Runner Ducks (Champions) 1 067 eggs laid in 12 months (6) General view of the duck pens

SEA-WEED FOR MANURE.

Settlers living on our coastlines have often asked if sea-weed is of any value as a manure. For their information, samples that had been forwarded from Busselton were handed over to the Government Analyst to report on. Mr. Mann reports as follows:—

"I have examined a sample of sea-weed forwarded by Mr. Gale, of Busselton, with the following result:—

	Per Cent.	
Moisture	65·00	
Organic matter	20·79	Containing Nitrogen ·76 %
Ash	12·21	
	100·00	

The ash contains, amongst other substances:—

	Per Cent.	
Silica	10·65	
Phosphoric acid	·56	Equivalent to ·20 % on original weed.
Potash	2·70	Equivalent to ·95 % on original weed.
Common salt ..	14·72	

"This sea-weed does not compare very favourably with many sea-weeds, being rather low in both nitrogen and potash. It would, nevertheless, like all sea-weeds, be of considerable value, especially on sandy soils. Applied at the rate of 20 to 30 tons to the acre, it provides a large amount of vegetable mold as well as a certain amount of fertilising ingredients to the soil. On account of the considerable amount of common salt present it would be best used after exposure to rain."

The sample analysed was quite fresh and had only just been cast on the shore when it was collected.

It shows many points in common with other sea-weeds analysed from samples collected from the coast of Brittany and Normandy, where some species are used for feeding pigs and also for manurial purposes.

Where it occurs in large quantities along our coastline, it would be advisable to cart it away beyond the beat of the waves and there leave it to shrink, rot, and dry during the rainy season, in order also to allow a large amount of the salt it is impregnated with to leach out. It could then be carried away at leisure in a more concentrated form and used on sandy soil, instead of farmyard manure, thus adding a large amount of vegetable matter to the soil.

Sea-weed has proved an efficient fertiliser for rye and for potatoes.

The varieties differ in their chemical properties, and arrangements have been made with the Superintendent of Fisheries to have the different kinds collected separately, if possible identified, and each kind analysed in order to ascertain more definitely their respective manurial values.

Thousands of tons of useful manure is allowed to rot on our shores each year, and the advisability of turning it to some more useful account is a matter that should not be neglected by those settlers who live in proximity to the sea.

SAN JOSE SCALE.

By T. Hooper, C.I.

For the information of those orchardists whose trees are yet affected with the San Jose scale, the following interesting facts relating to the subjection of this pest are published :—

This year up to date the number of infected trees have been reduced by over 1,400. This good result has been principally brought about by the thorough application of the lime sulphur and salt wash to not only the infected trees but also to those surrounding them, and in many cases to the whole area that was infected.

It is well, therefore, to impress upon growers the absolute necessity of doing the work thoroughly, seeing that every inch of the tree is properly coated, and that the spray is applied fresh and in dry weather. In particular I would draw attention to those cases where only two or three trees are infected, and whilst doing those surrounding them, carefully make extra sure of the ones infected, and if necessary do them twice, so as to absolutely eradicate the disease when possible.

It is also recommended to those growers whose trees have been previously diseased, and are returned clean for the first time, to still spray for one or two years, the area previously infected. The growers should in their own interest, as well as in the interest of the fruit industry generally, do their utmost this winter to eradicate this scale, so that next year we may be able to report even better progress.

When the work is done thoroughly, not only does it benefit the whole of the industry, but encourages the Inspectors, who leave no stone unturned in order to free the orchards of those pests that are so injurious.

NARROGIN STATE FARM.

Report for the Month of June, 1907.

By R. C. Baird.

Early in the month all the wheat and other cereal sowing operations were completed, the ground being in splendid condition for carrying out the work satisfactorily. This was effected with the assistance of the students themselves and of a greatly reduced staff in better time than has hitherto been the case.

All the crops have been put in under favourable conditions, and with the genial weather we have experienced during the month, rapid growth has been made.

A few sharp frosts occurred, but without producing any ill effects on the young crops.

The rains, covering five days of the month, fell at nice intervals, 231 points being recorded.

The Barley and Rape crop sown in April has made excellent growth, being now about eight inches in height. The dairy cows have been turned on to this crop, and the increased milk supply from them proves the advantage of early sown fodder crops.

Twenty acres of Field Peas sown in the latter part of April are looking well, having made good growth after the rains set in.

The grasses sown in April are nicely above ground, and with the favourable winter we have experienced so far, should become well established.

A number of wheats have been put in for trial, amongst them several varieties of the Maccaroni type; also a number of new varieties of both wheat, oats, barley, and rye received from the Hamel State Farm.

The sheep are in good condition for this time of the year, and as the feed is improving every week, they should more than hold their own. The lambing season is now practically over, and, although we have not yet done any lamb-marking, I expect a good percentage.

Work in connection with the erection of the new stables and barn has been carried out as expeditiously as possible.

THE FERTILISER AND FEEDING STUFFS ACT.

By Percy G. Wicken, Inspector of Fertilisers.

The imports of fertilisers continue to increase year by year, thus showing that they are becoming more used every season. Farmers are finding out from practical experience that it pays them to apply a dressing of fertiliser to their crops, and even on the best of soil a light dressing to give the crop a start will prove profitable. In the imports for the year superphosphate heads the list with 9,647 tons, the greater part of which is of European origin, but the Australian production is increasing year by year. Bonedust is next with 3,056 tons, in addition to which a considerable quantity of bonedust is produced locally. Of guano 229 tons were imported, mostly of Australian origin, in addition to which a large quantity of the local Abrolhos guano was used. Thirty-eight tons of nitrate of soda were imported, and of other kinds of fertiliser, the quantity imported was 5,584 tons. The value as per customs returns for the total of 18,554 tons being £63,783.

The following table kindly supplied by the Collector of Customs gives the list of imports and value of same for each month of the past financial year ending June 30th last. This information may prove of interest to those engaged in the fertiliser business as well as those who purchase same :

WESTERN AUSTRALIA

Return showing the Importations of the various Fertilisers into West Australia during the twelve months ended 30th June, 1907.

MONTH	BONEDUST				SUPERPHOSPHATES				GUANO				MANURES, OTHER				SODA NITRATE.			
	Australian		Oversea		Australian		Oversea		Australian		Oversea		Australian		Oversea		Australian		Oversea	
1906	cwts	£	cwts	£	cwts	£	cwts	£	cwts	£	cwts	£	cwts	£	cwts	£	cwts	£	cwts	£
July	1,943	512			545	143	1,540	280					710	321	1,300	325			60	40
August	11,222	2,833	2,500	614	1,010	251	200	40					940	361	480	240			40	21
September	2,448	605	500	120	400	78							1,610	612	80	56			140	89
October	2,150	559			1,320	288	200	40	30	6			2,014	580	190	86			100	58
November	3,808	1,039	1,000	252	600	138							1,356	409	300	56	40	23	40	30
December	1,740	470	3,660	998	366	128	4 000	822	2,000	300	40	10	2,190	621	2,300	551				
1907																				
January	3,080	813			450	90	16 000	2,695					2,020	605	910	243			20	12
February	1,888	507			5,140	1 023	50,790	7,154	2,520	373			705	231	82 550	7,021				
March	4,514	1,240	5,660	1,674	3,540	717	60,881	8,425					2 501	613	1,800	222				
April	3,800	976			7,870	1,606	31 000	6,301					1,153	434	503	266	20	14		
May ..	4,534	1,211	2,680	814	4,500	536	60	11					2,541	278	280	151	40	28	60	42
June	4,000	980			2,270	447	200	40					660	328	2,600	559			202	118
Total	45,127	11,725	16 000	4,472	28 065	5,445	164,887	25 908	4,550	679	40	10	18,400	5,393	93,293	9,776	100	65	662	410

A further list of fertilisers taken in accordance with the Act has been received from the Government Analyst. The result shows that the quality of the fertilisers supplied has been well kept up, very few of the samples being outside the limit allowed by the Act. This list practically completes all the fertilisers which have been registered in Perth, Fremantle, and Bunbury. A few have yet to come in from Albany, which will be published on a later date.

For the information of settlers the values of the fertilisers as registered, and as found by the Government Analyst, have been placed opposite each sample on the basis of the unit value. Settlers are thereby enabled to ascertain the difference in value between the various fertilisers, and be guided in their purchases accordingly.

The following are the unit values for the present year :—

Ingredient.	Form.	Value per unit. s.	d.
Nitrogen ..	In form of nitrates (nitrate of soda)	17	9
Do. .	Do. sulphate (sulphate of ammonia)	17	6
Do. ...	Inorganic matter (blood and bone manures) ...	15	3
Potash	As sulphate	5	10
Do .	As muriate	4	6
Phosphoric Acid	Water soluble	5	2
Do. ...	Citrate soluble	3	6
Do.	Acid soluble	3	3
Do. ...	In Thomas' Phosphate without regard to solubility ...	3	5

The value of the fertiliser is obtained by multiplying the percentage of each ingredient contained by the unit value of that ingredient.

THE ANALYSIS OF FERTILISERS.

	Number of Sample	Name of Fertiliser.	Where obtained.	Nitrogen.	Water Soluble Phosphoric Acid.	Citrate Soluble Phosphoric Acid.	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.	Value on Unit Basis. £ s. d.
Guaranteed analysis	132	Concentrated superphosphate	George Wills & Co., Fremantle		38·00	1·00		39·0		9 19 10
Found by Government Analyst	132	Do.	do. do		38 62	5·46	·29	44·37		10 19 6
Guaranteed analysis	134	Sulphate of potash	do. do.						48·00	14 0 0
Found by Government Analyst	134	Do.	do. do.						49·31	14 7 8
Guaranteed analysis	123	Bonemeal ..	do. do	3·0			23·0	23·0		6 0 6
Found by Government Analyst	123	Do.	do. do	4 60		5·10	18 71	23·81		7 8 8
Guaranteed analysis	121	Superphosphate	do do		16 0			16·0		4 2 8
Found by Government Analyst	121	Do.	do. do		16 29			16·29		4 4 1
Guaranteed analysis	125	Haynes & Co.'s Fertiliser (C over WS in triangle, over 3)	W R. Haynes & Co , Perth	5 36			17·4	17 4		6 18 2
Found by Government Analyst	125	Do. do. do.	do. do.	5 57		14·42	7·21	21 63		7 18 9
Guaranteed analysis	136	Superphosphate	Guthrie & Co , Fremantle		19·0			19·0		4 18 2
Found by Government Analyst	136	Do.	do. do.		19·16			19·16		4 18 9
Guaranteed analysis	140	Blood manure	do. do.	6 0			1·1	1·1		4 15 0
Found by Government Analyst	140	Do.	do. do	8 4			1·39	1·39		6 12 7
Guaranteed analysis	139	Bonedust, Elephant No 2	do. do	3·7			22·8	22·8		6 13 9
Found by Government Analyst	139	Do.	do. do	4 2			22·34	22·34	..	6 16 7
Guaranteed analysis	138	Bonedust, Elephant No 1	do do	3·5			15·30	15·30		a5 12 9
Found by Government Analyst	138	Do.	do. do	2·43			14·6	14 6		b4 4 5
Guaranteed analysis	117	Abrolhos Guano	do. do	1·0		13·07	6·93	20·00		b4 3 7
Found by Government Analyst	117	Do. ..	do do.	1 85	...	5·06	12 55	17 61		4 6 7
Guaranteed analysis	133	Bonedust, Kangaroo	Paterson & Co., Fremantle	3 5		3 00	16·00	19·00	..	5 15 10
Found by Government Analyst	133	Do.	do.	9 27		8 54	11·38	19·92		10 8 1
Guaranteed analysis	129	Kainit	W A Producers' Co-operative Union, Welshpool						12 00	3 10 0
Found by Government Analyst	129	Do	do						11·99	3 9 11

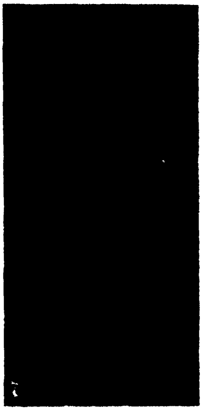
Guaranteed analysis	126	Nitro bone manure	Binney & Son	2·6	..		15·00	15·00	...	4 8 4
Found by Government Analyst	126	Do.	do.	3·5	...	...	14·28	14·28	...	4 19 8
Guaranteed analysis ...	127	Bonedust	do.	2·75	...	...	18·30	18·30	...	5 1 4
Found by Government Analyst	127	Do.	do.	3·6	...	...	19·2	19·2	..	5 17 2
Guaranteed analysis	128	B. B. & S.	do.	3·75	...	...	15·60	15·60	...	5 5 11
Found by Government Analyst ...	128	Do.	do.	3·78	...	...	15·60	15·60	...	5 8 3
Guaranteed analysis	123	Superphosphate	Elder, Shenton, & Co.	...	17·00	...	...	17·00	...	4 7 10
Found by Government Analyst ...	123	Do.	do. do.	...	16·55	...	...	16 55	..	4 5 6
Guaranteed analysis	111	Superphosphate	Dalgety & Co.	...	16·4	...	...	16·4	...	4 4 8
Found by Government Analyst ...	111	Do.	do.	...	16·87	1·22	·12	18·21	...	4 11 8
Guaranteed analysis	112	Thomas' "Globe" phosphate	Guthrie & Co.	..	...	...	14·00	14·00	...	2 7 10
Found by Government Analyst ...	112	Do. do.	do.	...	...	...	14·12	14·12	...	2 8 2
Guaranteed analysis	113	Thomas' phosphate	Dalgety & Co.	...	...	14·33	...	14·33	...	2 10 9
Found by Government Analyst ...	113	Do.	do.	...	..	..	17·9	17·9	...	3 1 1
Guaranteed analysis	114	Do.	Geo. Wills & Co.	...	...	.	14·00	14·00	...	2 7 10
Found by Government Analyst ...	114	Do.	do.	...	...	...	14·68	14·68	...	2 10 1
Guaranteed analysis	115	Prolific fertiliser (Ockerby)	do.	2·66	...	9·95	5·29	15·24	...	4 12 5
Found by Government Analyst ...	115	Do. do.	do.	4·48	...	4·72	7·68	12·40	...	b5 9 8
Guaranteed analysis	116	Blood fertiliser	Gardner Bros.	7·01	...	..	1·18	1·18	1·28	5 18 1
Found by Government Analyst ...	116	Do.	do	8·90	...	...	1·22	1·22	·58	c7 2 8
Guaranteed analysis	118	Thomas' phosphate	Couche, Calder & Co.	...	...	14·00	...	14·00	...	2 9 10
Found by Government Analyst ...	118	Do.	do.	...	.	...	13·79	13·79	...	2 7 1
Guaranteed analysis	119	Swan lawn manure	Binney & Son	4·25	...	...	8·0	8·0	..	4 10 9
Found by Government Analyst ...	119	Do.	do.	3·50	...	6·81	5·09	11·90	..	a4 13 8
Guaranteed analysis	120	Swan blood and bone	do.	5 00	...	...	8·25	8·25	...	5 3 6
Found by Government Analyst ...	120	Do.	do.	1·65	...	1·26	2·96	4·22	...	ab1 19 0
Guaranteed analysis	124	Thomas' phosphate	Harris, Scarfe & Co.	...	...	11·2	..	11·2	...	1 18 3
Found by Government Analyst ...	121	Do.	do.	...	..	...	15·21	15·21	..	2 11 11
Guaranteed analysis ...	126	Nitro bone manure (Binney & Son)	J. M. Drummond & Co.	2·60	...	...	15·00	15·00	.	4 8 4
Found by Government Analyst ...	126	Do. do. do.	do.	3·5	...	..	14·28	14·28	...	4 19 8
Guaranteed analysis	127	Bonedust (Binney & Son)	Binney & Son, Welshpool	2·75	.	..	18·30	18·30	...	5 1 4
Found by Government Analyst ...	127	Do.	do. do.	3·6	...	...	19·2	19·2	...	5 17 2

a Deficient in Nitrogen. b Deficient in Phosphoric Acid. c Deficient in Potash.

THE ANALYSIS OF FERTILISERS—*continued.*

	Number of Sample.	Name of Fertiliser.	Where obtained.	Nitrogen.	Water Soluble Phosphoric Acid.	Citrate Soluble Phosphoric Acid.	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.	Value on Unit Basis.		
										£	s.	d.
Guaranteed analysis ...	121	Superphosphate ..	Geo. Wills & Co., Fremantle ...	...	16·00	.	...	16·00	.	4	2	8
Found by Government Analyst ...	121	Do.	do. do. ...	...	16·29	...	.	16·29	...	4	4	1
Guaranteed analysis ..	123	Do. ...	Elder, Shenton & Co. ...	...	17·0	..	...	17·0	..	4	7	10
Found by Government Analyst ...	123	Do. ...	do. ...	...	16·55	..	...	16·55	...	4	5	6
Guaranteed analysis .	125	C over WS in triangle, over 3, Fertiliser	Haynes & Co. ...	5·36	...	...	17·4	17·4	..	6	18	2
Found by Government Analyst ...	125	Do. do. do.	do. ...	5·57	.	14·42	7·21	21·63	..	7	18	9
Guaranteed analysis ..	135	Muriate of potash .	Gardner Bros. ...	..		.		...	50·00	11	5	0
Found by Government Analyst ...	135	Do. ...	do. ...	.		..	...		58·38	13	2	8

SUBIACO EGG-LAYING COMPETITION



(7.) Mr G. Allman, Manager (8.) Adelaide Poultry Yards' Indian Runner Ducks (Second place) 928 eggs laid in 12 months

9. Erieville Poultry Farm's Buff Orpington Ducks (Third place) 913 eggs laid in 12 months (10.) Mr Davis, Assistant Manager

By kind permission of the *Western Mail*

VEGETABLE GROWING.

By G. Chitty Baker.

(Continued.)

Sweet Potato (Batatus edulis).

The sweet potato is a native of South America and grows to perfection in warm, moist, sub-tropical regions. It adapts itself, however, to many parts of the more temperate zone of these States. It is grown with great success south of Bunbury. It is very hardy and many of the varieties cover the whole of the ground with dense foliage which is much relished by all kinds of stock. The tubers serve to make a most acceptable acquisition to the dinner table, while at the same time proves a most valuable ration for pigs, dairy cattle, and other kinds of stock. In districts around Perth and north of it a plantation once made will last for years.

The best kind of soil is that of a sandy loam of good depth; stiff clayey soils cause the tubers to split in the summer when the ground becomes caked. In preparing the ground it should be worked to a depth of at least two feet, mixing well-rotted stable manure liberally with the soil during the operation.

The best way to start is to obtain the tubers in August and prepare a bed for them as follows:—Mark out a place in light sandy soil about 6 feet square; remove four inches of earth from this and lay your tubers on the bottom. This space will hold about 2 cwt. of tubers, which should supply enough shoots to plant an acre of ground. They must be separate from each other and not touching anywhere. Then replace the soil previously removed covering all up snugly. Do not allow the bed to become too dry, neither must it be allowed to get too wet. In fine weather shoots will start to show in about three weeks. When just above the ground they are ready to remove, which is done by gently shifting the earth until you lay the tuber bare that has the shoots on; break these off carefully without disturbing the tubers, cover up again and soon more shoots will make their appearance. If there is no ground suitable, then a frame can be made of boards and filled in with light soil well mixed with horse droppings.

Early in October the shoots should be ready to pull and taken to where it is intended that they should remain, dribbling them in two feet apart in rows three feet apart. If it is found that a tuber has all its shoots well grown, then it can be removed wholly from the ground and carried to the permanent bed, breaking off the shoots as you want to plant them. The shoots should be removed like you would pull rhubarb, with a downward, steady pull.

If the weather at the time of planting is dry, then a little liquid manure poured into the holes will be found a great help. Keep the ground between the plants well cultivated, and when they have been growing for about two months a dressing of fertiliser should be given them, consisting of 3 parts of superphosphate, 3 parts sulphate of ammonia, and one part sulphate of potash, at the rate of 3 cwt. to the acre, well working it into the soil by means of a cultivator, the Planet junior being the best implement to use for this particular work.

In wet soils it is wise to throw up ridges, say 12 inches high, and plant the cuttings on top. Misses may always be made good from a small piece cut off some one of the growing plants and put in the vacant space.

The tubers are ready for digging about March, the proper time being known by breaking off the end, and if a milky substance oozes out it shows that they are not matured and should be left a little longer. Tubers may, however, be removed at any time when required for immediate use, a sharp knife being used to separate them from the vine, then carefully pulling up the tuber.

Those varieties that make abundant vines should have their runners cut back to 18 inches from the plants, otherwise the crop will suffer.

In districts where there are only few light frosts, it is usual to leave the plants all the winter, removing all saleable tubers. Cut back the vines to eight or ten inches, pressing these into the ground and they will continue to grow, with a result that early tubers may be obtained the following season.

In my own garden in South Perth I can always rely on obtaining good sized tubers at Christmas. They should not, however, be grown for more than three years in any one spot.

After the crop is pulled a liberal dressing of manure is dug in between the rows and the space made use of for saladings, such as lettuce, radish, shallots, or onions. Care must be taken in digging and handling not to bruise the potatoes, as a small bruise when freshly dug is likely to cause the potato to rot. It is also beneficial to leave the potato in the sun for a short time after being dug before bagging or putting into a shed, and when bagging, all damaged, cut or bruised potatoes must be excluded. These damaged potatoes will only keep for a short time, and can be used on the farm for feeding pigs or other stock.

One of the most difficult points about Sweet Potato growing is the difficulty of keeping them so as to market at times of the year when they will fetch a good price, and also during the winter months so as to have a supply for the seed beds in the spring. The best way on a large scale is the method of "hilling or banking." This should be carried out under a shed or open roof so that the bank is not exposed to the weather. The best method to proceed is—lay on the ground, which must be dry, a good layer of straw, on top of this pack the potatoes in the form of a mound and cover the whole heap with a quantity of straw, and then put sufficient earth on top to cover the whole. In many instances where large stacks are built a zinc pipe perforated with 1 inch holes is placed through the centre of the stack, which allows all surplus moisture to escape while the potatoes are going through the sweating process. Another method which is only applicable on a smaller scale, but which has always been found very successful, is to obtain a number of old empty cement barrels, which can generally be picked up very cheap, place in the bottom of the barrel a layer of dry sand about 3 inches deep, then a layer of potatoes, then another layer of sand and so on until full, placing about 4 inches of sand on top of the barrel, this will keep the tubers quite sound all through the winter, and only one barrel need be opened at a time as required for use.

There are a large number of varieties of sweet potatoes. At the Georgia Experimental Station, U.S.A., thirty-four varieties were grown last season and reported on, the heaviest yield being the White St. Domingo. In the Australian States, however, only two varieties are at the present time obtainable, and they are generally known as the White Sweet Potato and the Red Sweet Potato. Both are good varieties and grow and yield well, the white will grow in cooler districts than the red. Both these varieties do particularly well in and around Perth.

Pumpkins (*Cucurbita melopepo*).

This well known vegetable can be grown with very little trouble from August to December, adapting itself to almost all kinds of soil. To ensure good results holes three feet in diameter should be dug out about two spits deep, mixing a good barrowful of well-rotted manure with the soil and replacing the same back into the hole. The seed may then be sown about one inch deep, half a dozen to each place, thinning out to three, leaving the strongest plants to grow.

Those liking a good dry pumpkin, the well-known old favourite the "Ironbark" will be found a good one to grow, or if a soft squashy one is preferred, then the "Trombone" or the "Turk's Cap" will be appreciated.

Radish (*Raphanus sativus*).

This popular salading vegetable will be found to thrive best on well worked and deep drained soil that had received a heavy manuring with the preceding crop, fresh manure causing unshapely roots. In the cooler months the seed should be sown in drills in order to facilitate weeding. In the warmer months, however, when the growth is much quicker, small beds may be sown broadcast. In order to keep up a succession, sowings should be made every week, judging the quantity required. If allowed to grow after once reaching the size fit to pull, the majority of them commence to become spongy.

Two of the best kinds to grow is the "Icicle" and the "Carmine Icicle." The oval-shaped varieties have of late years become very popular.

The best way to sow seeds broadcast is to dig up the bed, well pulverising the soil, rake level and smooth, scatter the seed over very thinly, then sift dry horse droppings over all until the seeds are well hidden; then firm well down with the back of the spade. An occasional watering of 1oz. of superphosphates and half an ounce each of sulphate of potash and sulphate of iron to each two gallons of water will greatly improve the crop.

Rhubarb (*Rheum hybridum*).

Rhubarb is so highly valued that comment on it is unnecessary. It is both wholesome and very beneficial. Were its qualities better known even more would be used than at present. Although easily grown, for profitable production it requires a deeply cultivated soil, well fertilised with a heavy dressing of well-rotted stable manure to which may be added a liberal sprinkling of bonedust, while during growth, dressing of superphosphates, sulphate of ammonia, and sulphate of potash should be applied at the rate of two pounds of superphosphate and one pound each of the other two to the square rod, taking care that the mixture does not go over or too near the plants. This should be worked lightly into the ground followed by a good watering.

Rhubarb is grown best from roots obtainable from April to August, planting them so that the crown is about two inches below the level of the ground, from three to four feet apart every way. Stalks should never be pulled the first season but allowed to remain. Seed stalks should be cut out, as they tend to weaken the plants.

By a proper selection of varieties rhubarb may be pulled all the year round. The best for winter use is "Topp's Winter."

When roots cannot be obtained the plants may be raised from seed, which should be sown in a well worked bed of good loamy soil, covered with a good mulching of stable manure in August or September. The young plants should be kept growing with frequent waterings if the weather is very dry. Let the plants remain in the seed beds until autumn, when they should be transferred to the permanent beds, made on the best soil, trenched two feet deep, and manured with half decomposed stable manure. The plants should be three by four feet apart, and the whole bed dug and heavily manured every year.

Salisify or Oyster Plant (Tragopogon porrifolius).

Salisify requires the same conditions as that described for carrots and parsnips. It is a root that is generally considered in England as a test of the gardener's skill. The roots require to be prepared for use by scraping them, then steeping in water containing a little lemon juice or vinegar, when it is boiled until tender, and served with white sauce. To prepare them as "vegetable oysters" the roots are first boiled whole, allowed to get cold, then cut in slices, and quickly fried in butter to a light golden brown, a little salt and pepper being sprinkled over them while in the pan.

Sea Kale (Crambe maritima).

This plant will grow well in any ordinary garden soil. The seed should be sown in August and September, in drills two feet apart. It responds well to liberal manuring. A bed once made will last for two or three years. Plants should be covered with leaves or other light stuff, as a plump and delicate sample can only be grown in darkness, uncovering occasionally to see how the growth is continuing. The leaves should be cut close, taking a small piece of the crown with it. When all the crop is off remove the covering and dig in a good supply of well-rotted manure. The crown will soon send out a number of shoots, these should all be removed except two or three of the strongest, which will form the crowns for the following season's crop. At the time of thinning the shoots or buds take away any small blanched shoots that may have been left over, this will prevent the forming of flower stalks, which are very detrimental to the continuous growth of the plant.

Spinach (Spinacea oleracea.)

The soil for Spinach requires to be made very rich, so as to grow it quickly, and obtain the largest weight of leaves. The Round Spinach is grown for summer use, and the Prickly or Flanders varieties for winter. The first sowing may be made as soon as the first autumn rains have fallen and successional sowings once a month until the weather becomes too dry, unless water is plentiful, when sowing may be continued throughout the year. The seed should be sown thinly, in drills which, in winter, should be eighteen inches or more apart, and the plants thinned to twelve inches ; the spring and summer crops need not stand further apart than half that distance. In gathering the leaves for use, they are taken singly from the winter crops as they attain full size, but in summer the whole plant may be cut off by the ground.

(*To be continued.*)

BREADSTUFFS STATISTICS.

(Amended Estimates, 1907.)

1.—*Wheat requirements.*

On the assumption that the mean population for the year 1907 will be 265,000, and that the apparent requirements of wheat for food per head of population will be 7.9 bushels, the total amount required for food during 1907 will be 2,093,500 bushels.

To this must be added the quantity of seed to be sown for grain and hay during the season, which, on the basis of the experience of recent years, may be roughly estimated at 500,000 bushels.

The total amount of wheat required by this State during 1907 will thus be 2,593,500 bushels.

2.—*Wheat and Flour.*

Early in the year an attempt was made to ascertain the amount of wheat and flour stored throughout the State at the end of 1906, and carried over to 1907. Circulars asking for this information were sent to 25 flour millers, 10 wholesale storekeepers, 77 produce merchants, 232 bakers, and 821 grocers and storekeepers, and replies were received from 16 flour millers, 8 wholesale storekeepers, 37 produce merchants, 91 bakers, 165 grocers and storekeepers. This result, all things considered, is not unsatisfactory, as it may be safely assumed that the returns received represented probably most of the principal holders. To the total of the quantity of wheat and flour thus obtained, was added that stored by the Railway Department, as were also the stores held over by the farmers, these being reported in the Agricultural Schedules. Thus it was shown that at the beginning of the year a quantity of wheat and flour was available for consumption equivalent to 706,851 bushels of wheat.

According to the preliminary wheat returns for the past season, it would appear that the aggregate wheat yield for the whole State was approximately 2,758,567 bushels.

3.—*Surplus available for Export.*

It will thus be seen that not only ought the requirements of the State probably to have been fully met by the quantities of wheat and flour available at the end of the past harvest season, but also a surplus quantity of wheat and flour, equivalent to 871,918 bushels of wheat, should have been available for export, pig food, poultry food, etc., or other farmyard use.

This may be summarised as follows :—

4.—*Amended Estimates,* 1907.

		Bushels (wheat).
Available on 1st January, 1907		706,851
Preliminary returns of wheat production for season February, 1907 ...		2,758,567
Available, February, 1907		3,465,418
Mean population	265,000	
Consumption per head of wheat for food ..	7 9 bushels	
Total food requirements	2,093,500 „	
Seed requirements	500,000 „	
Gross requirements for food and seed		2,593,500
Available for export, etc.		871,918

MALCOLM A. C. FRASER,
Government Statistician.

28th June, 1907.

COLD STORAGE NOTES.

A Modern Mutton Export Works.

By A. D. Cairns.

Thirty years ago, that is in the month of July, 1877, the first attempt was made to transport oversea frozen meat from Sydney by the good ship "Northam." Uufortunately, however, the machine broke down as the ship was just about to sail, and the whole of the meat had to be disposed of. Chambers had been built with hollow walls, between which tallow had been packed, to preserve the flavour of the meat, which it was thought was the proper thing to do in those days.

This month therefore is a fitting one to look back on the progress made in Australasia. The name of the first ship to make the attempt of establishing the frozen lamb industry reminds us of the township of Northam, which, from many standpoints, must in the near future prove an important factor in the coming industry of exporting frozen lambs, that is, so far as this State is concerned. An imaginary trip made with the commodity under observation, from the time the lamb makes its first gambol to the time it arrives at Smithfield, via what Sir Joseph Ward would poetically call "The Appian Ways of Commerce" should not be uninteresting.

The memory of the Engineer Journalist, James Harrison, of Geelong, should be kept green when dealing with the beginning of things frozen, for to him, and to his undying honour be it said, we in Australia owe much. In the world's list of notable events his work is summed up in the one line thus "1873, carcases by Harrison's method sent to England from Australia." From the inventors to the pasture, where we are introduced to the three or four months' old lamb, is an easy transition. We will assume that his parentage is above reproach, as the local Shropshire Breeders' Association, or its equivalent, will assure us. His tail has been cut and seared by the most modern and humane invention, which is his first introduction to the Engineer ; he finds by this method when cut the proper length that his tail is not a burden nor a tax on his mutton-producing equipment, for under the ancient filthy system of having his tail cut off, the blow fly or frost-nip used to be a heavy call on his vital force, not to mention the direct loss of blood entailed, which also invites crows, and when he has to further meet the gentleman who filled the office of providing tenor singers in the early Spanish Inquisition, or stockmen for the Eastern harems, his lot for the first month of his existence is not always a happy one. At four months old then he is fit for the market, the losses indicated above having been reduced to a minimum, and his weight correspondingly relatively high, thanks to tail searing, he now comes under the eye of the buyer.

The price being struck, he walks, or is trucked to the works siding, and thus commences to contribute to the wage-sheet of his handlers. After resting in the pens he is hauled forth into a large shed, much different from the wool-shearing shed his old mother mentioned whilst browsing in the fattening paddock, filled with butchers and other operatives all armed with knives and wrapped around the lower limbs with hessian or basil leggings. A burly giant with deltoids and biceps like a Sandow grabs him, ties three of his legs together, throws him on his side, severs his head, and repeats this barbarity to another half-dozen at the same visit. His blood runs along a conduit into a tank, if the slaughter-house is two-storey, or into a truck if on the ground level, into a flat shallow tank of steel, fitted with a perforated coil, is coagulated in about 15 minutes; a handful of sulphate of iron is thrown into the mass which the operator meanwhile is gently stirring. The coagulated mass is then centrifugally treated to reduce the water contents, or it may be strained and spread out in the sun to dry, according to site and the output of the works. After coagulation it is further dried in a rotary Dryer or similar apparatus, whereby a continuous feeding of the product consistent with the evaporative power of such machine reduces it further to the stipulated water content or "moisture, 12 per cent." state. The dryer, whether it be a "Farmer," as in Melbourne, a "Cummer," or "Anderson," as in Queensland, or a "Gable," or perhaps "Powter," as in New Zealand, all operate to this end of conserving the nitrogen content to its highest degree by low evaporating temperature. An average mutton return on two hundred and forty thousand sheep was .63lbs. per head of 13 per cent. nitrogen value; from this point back to the soil is easy to follow. Sometimes this is mixed with offal residues, dried fertilisers, and further mixed with phosphates and made into more or less Complete Fertilisers.

The barbarian slaughterman next dumps him out on the clean floor, within a space of not less than four feet from the nearest dresser. A few tufts are then severed from his shanks to provide openings for the entrance of the hand between skin and carcase, and the gambrel is inserted as soon as the trotters are severed and flung into the shoot. The carcase is then lifted and hung on to the dressing hook, minus head and trotters. A deft perpendicular incision is then made, the knife restored to the pouch (or sometimes the teeth of the barbarian), and now comes the muscles into play, and by sheer force he rends the skin from the hanging body. Should grass seed have penetrated beneath the pelt the hands suffer terribly during the pounding action used in the operation. This is the most exhausting part of the work, and the fine specimens of manhood usually employed in this particular branch show to great advantage in their clean tight-fitting flannel shirts. The viscera is then removed, the larger vessels to the "gutties" for cleaning preparatory to boiling down, and the liver to the " kidney " boy, who deftly collects in a basket both these delicacies with the " fry " for the chill room or local butcher. The New Zealand intestines are thick enough to work up for casings, but Australian sheep as a rule are too thin-gutted and the great bulk is simply boiled down for fat and fertilisers. With a powerful downward shove of the knife the breast or brisket bone is parted, the rich delicate caul fat is put into a vessel of clean cold water, a rub down with a clean hot water rag and a close look all over before tying back the fore feet in "round" dressing for export stowing, and the carcase is dressed. The butcher then may lift him the prescribed nine feet to the trolly rail, and hang on his tag for delivery to the louvred cooling and grading room. The "gutties" are lads from the neighbourhood who, in many cases, graduate into fine butchers, and are of the class we look to for recruits. After they have separated all the clean fat and put the stuff for the digesters into trucks, a six hours' treatment in a digester, under steam at 40lbs. pressure, with capacity for the entrails of a thousand carcases each charge, the fat return of one and a-half to two pounds of mutton tallow per head, which is always in demand, is the result. The tender oleo fats find their way, after rendering into casks, to various industries; the trotters may go into tins, or have their oil extracted and sold at 3s. 6d. per gallon; while the shank-bones go to Japan or Birmingham, as need be, the horns to the button-maker or knife manufacturer, and the little hoofs are utilised for glue and fertiliser.

Some slight variations to the above may take place, according to locality, but the general outline is identical. During these operations the veterinary stock inspector is busily at work, and his position is no sinecure. His eyes are everywhere; he looks for signs of " tuber " or " pleuro " or " liver fluke " on every organ, and all suspicious organs must be identified with their respective carcases, or the mutton consumer would not enjoy the immunity he does from diseased meat, or rather, what is threatened with disease. One must not forget we are dealing with a carefully-bred commodity, where every inherited or acquired lamb trouble is carefully prevented, and the few condemned carcases is sufficient testimony to the purity of the stock in most places. Should any sheep troubles be in the district which bred the rejects (which are forthwith boiled down) it is soon known to the District Stock office and remedial measures taken. The annual quantity treated by a works is probably the safest and most thorough source of reliable data that the stock breeder can command. After the tag bearing the official stamp of inspection is affixed the grading is completed. Further rejects, through being undersized, are sold locally, or sent to Western Australia. Grades 28lbs. to 36lbs., and so on, are seen in long rows and are as like each other as two peas. The pelt or skin, which is worth 3s. upwards, is a source of much wealth to a neighbourhood. While many of the Autralians bale their pelts, the rainy climate of New Zealand calls for more careful treatment. The largest portion of some of the works killing 5,000 per day, is the fellmongery department. Two processes are in vogue, viz., " Sweating " or " Chemical " treatment, for de-wooling the pelt. By sweating, a close heated chamber is hung for one night full of fresh pelts, until the temperature and humidity rise sufficiently to loosen the wool; they are then removed, and the different grades of wool are thrown by the fellmonger into the various receptacles. The " Chemical " treatment, in which sodium solution is painted on the skin side, thereby loosening the wool at the roots, gains the same end without chamber heat. The pelt after de-wooling goes through a light tanning process, is dollied and sometimes split into basil, and is barrelled into 10cwt. kegs, in pickle, ready for shipping. The wool-drying has developed several fine machines. The " Petrie, Rochdale " wool dryer, used in most of the high-grade works, costs £1,000. Baling as usnal follows in the different grades for the London or continental market.

The table part of the lamb now having left the dresser with the latter's tag upon it, comes under the eye of the grader, and is weighed, classified, and passed into the chiller, where the musky odour of mutton is absorbed by the forced air-cooler. In four days' time it will have passed through the chiller and freezer, and now, having acquired a branded, light calico shirt, it is fit for storage and transport to Smithfield market, and thence to the table of the consumer.

The Australian practice of slaughtermen doing all the work of killing and dressing is found to be better than the American method of " string gangs" so mellifluously written upon by Foster Fraser as the highest embodiment of industrial organisation. The responsibility of marks to pelt or carcase, or any careless work, is at once located and the operative known by his Tag.

The piece-work rates obtaining here of 20s. to 25s. per hundred, dressed according to destination, make a far better all-round intelligent workman than the American string gang system, where one man makes only one cut and passes the carcase on. He (the American) is a useless automaton outside of his special place, while the Australasian operator is a master workman after the best British traditions of apprenticeship.

BLACK BOY.

REPORT OF DR. VOELCKER'S ANALYSIS.

An interesting report received from Dr. Voelcker on the commercial value of the "Black Boy" has been handed to the Under Secretary for Agriculture by Messrs. Bateman, of Fremantle. This firm has taken great interest in the subject, and it was at their request that Dr. Voelcker had gone into the matter. The report is as follows :—

Copy of Dr. Voelcker's Report on the Grass Tree.

"We have pleasure in now reporting to you on the investigations we have made with the Grass Tree (Black Boy) which you sent us. We have been aided in this by the report supplied by the Government Analyst of Western Australia (which appeared on page 162 of Vol. XIV. of the *Journal* of the Department of Agriculture, W.A.), a copy of which was sent to us by you, and as details of growth, general appearance, etc. of the tree are given in this, it is unnecessary for us to go into these further. Accordingly we confine our remarks to our examination of (1), the core of the tree ; (2), the exuded resin.

"You were good enough to supply us with abundant material, a whole tree trunk, about 5ft. in height being sent to us.

"A. *The Core.*—We took portions of this and submitted them to analysis. The core has a distinctly sweet taste, and it has been suggested that it might be made use of either as a source of sugar or of spirit to be obtained from this, or as a cattle food. To its utilisation in these directions our attention was turned. We took samples of the core in its fresh state, and made analysis of this, obtaining the following figures :—

Water	52·24
Matters soluble in cold water	17·31
Matters insoluble in cold water	30·45
	100·00

	Dr. Voelcker's.	W.A.G.A's.
Moisture	52·24	9·19
Albuminous bodies	2·37	2·83
Reducing Sugars (reckoned as Glucose)	3·81	10·25
Non-reducing Sugars (reckoned as Cane sugar)	8·11	15·86
Other carbohydrate matters	12·36	24·76
Woody fibre	18·43	35·93
Mineral matter (ash)	2·68	·40
Fat	...	·78
	100·00	100·00
Containing Nitrogen	·38	
Including Silica	·09	

"We have placed side by side with our analysis that of the Government Analyst, as it is important to compare these. The most striking difference is in the amount of moisture shown, and this, we need hardly point out, is a factor to which much significance belongs, as on it may turn entirely the possibilities of employing the material commercially. We do not, of course, know what samples the Government Analyst had to work upon, but it would seem to us very certain that these did not come from the tree direct, but must have been, or become, dried, otherwise they could not have shown a moisture percentage of 9.19 only, whilst ours gave 52¼ per cent. At all events our samples were taken from the core direct, and represent it as it came *ex* ship. Hence we must adopt our figures in considering the tree as regards its possible utilisation. We may say that if we calculate our results on the basis of 9.19 per cent. of moisture only, our results in regard to other analytical features agree in most respects very fairly with those set out in the Government Analyst's results.

"There is a marked difference, however, in the mineral matter, but of this we can offer no explanation, and only assure you of our figures being correct. We obtain very similar figures of Cane Sugar (reckoned), but less Glucose. It is of course an assumption that the matters which, either directly or after inversion, reduced copper salts, were sugars in the true sense, as other bodies have this property also. But even assuming this the total amount of saccharine matter in the core could not exceed 12 per cent. This, if calculated on the whole tree, would give no larger quantity of sugar than 7lbs. or 8lbs., and even were it feasible to obtain this readily in a crystallisable condition, it could not possibly "pay" for the preparation. Nor would there be any possibility of expecting that a remunerative alcohol yield could be obtained from so small a yield, comparatively, of saccharine matter. Added to this are the difficulties associated with the purification of the spirit, and the nature of the product is such as to make this practically unworkable. Doubtless, on the spot, a crude spirit might be obtained by fermentation and distillation, but as a source of alcohol for export purposes the matter is, in our opinion, not to be thought of.

"Further, as a cattle food, we do not think that the core, if broken up, would form a suitable feeding material. The amount of woody fibre is so great, and its nature such that we doubt the feasibility of obtaining it in a sufficiently soft or digestible condition. It tears into long and very hard and sharp fibres, and though the sweetness lends some attractiveness to it, we can hardly imagine its being safely used as a feed, while any attempt to soften it by cooking or steaming must result in the withdrawal of the saccharine mater, which practically constitutes its entire claim as a feeding material.

"B. *The Resin.*—This we have also examined, you having submitted to us several different specimens. Being obtainable through natural exudation, or by the adoption of simple and inexpensive methods, there is much more prospect of the successful employment of this portion of the tree. We find that a considerable portion of the powdered resin is soluble in water. Determinations we have made give over 20 per cent. of such soluble matter, and this being so, will militate against the employment of the material for the preparation of the best kinds of varnish. It may, however, be quite well used—as has, we believe, been the case—for inferior varnish.

"Lastly, we have examined the resin for the purpose of seeing whether from it any dyeing material can be obtained, but have not been able to find such to be present."

SWEET POTATOES.

(*Ipomoea Batatas.*)

The following report on trials of the Sweet Potatoes made at the Hamel State Farm, has been received from the manager, Mr. G. F. Berthoud:—

Rooted cuttings of the seven varieties named below were planted early in October, in rows four feet apart. The cuttings were set at every three feet along the row. Soil—sandy loam of moderate quality, deeply worked. Complete fertiliser applied at the rate of 6 cwt. per acre, well mixed in the drills below the sets. These plots retained fair moisture during the summer which proved to be a long and dry one. The sweet potato is deserving of more attention from agriculturists in this State. The plant is easily grown, free from disease, and generally yields fair returns. Every part of the plant is useful for stock feeding.

"Yellow Spanish."

Rooted cuttings planted first week in October. Robust grower, the fine healthy vines cover the ground with thick foliage. One of the best kinds for extensive culture. Dug 22nd June. Tubers large and chunky, fairly even in size and shape; skin light yellow, flushed with pink. Yield good, rate of 9 tons per acre. Fair cooking quality.

"Red Jersey."

Tubers imported from the Department of Agriculture, Sydney. Young plants set out 10th October. Growth healthy and fairly vigorous. Dug 21st June. Tubers of medium even size, clustered close to the stem, and very easy to dig; skin smooth, bright rosy red; flesh fine-grained, and a good cooker. Yield good, rate of 8 tons per acre. Very promising variety.

"Big Stem Yellow."

Tubers imported from the Department of Agriculture, Sydney. Rooted cuttings planted out 10th October. Growth strong and healthy. Dug 21st June. Tubers long, of fair size, set close to the stem; skin smooth, deep yellow. Cooking quality good. Yield at the rate of 8 tons per acre. Promising new variety.

"White Maltese."

Rooted cuttings set out first week in October. This variety requires good soil and heavy manuring to obtain full crops of large tubers. Many plants on this plot were destroyed by cut worms. Dug 24th June. Tubers long, white, set far from stem, and very rooty. Yield light. Not a suitable kind for profitable culture here.

"Pierson."

Tubers imported from the Department of Agriculture, Sydney. Rooted cuttings set out 10th October. The young plants began to make fine growth, unfortunately the cut worms came and killed off nearly all the plants. The few that survived gave very good results. Dug 24th June. Tubers large, round, yellow, set fairly close to the stem. New and promising variety.

"Spanish Giant."

Planted out first week in October. Growth healthy and vigorous. In habit and foliage very similar to "Yellow Spanish." Dug 22nd June. Tubers large; skin pale yellow, set rather far from the stem, and hard to dig. Yield good, rate of 9½ tons per acre. Fair variety.

"Rosella."

Rooted cuttings set out first week in October. Growth weak and slender. Plants on this plot badly damaged by cut worms. Dug 24th June. Tubers long and of uneven shape; skin light pink, set far from stem, often 4 to 5 feet, which makes this variety very difficult to dig out. Yield at the rate of 9 tons per acre. Quality first class; one of the best for table use.

TRYPANOSOMIASIS IN CAMELS.

By Dr. Cleland.

A new danger has been revealed as the result of bacteriological examinations conducted of some blood slides taken from a number of the 500 camels that have been in quarantine at Port Hedland for the past three months. The danger lies in the possible introduction of *surra,* a disease, knowledge concerning which is comparatively recent, but which in the countries where it has been known to exist has done a considerable amount of damage. Its transmission is brought about by suctorial flies, and it is the presence of these, should they exist where the camels are, that constitutes the danger. Dr. Cleland, the bacteriologist of the Health Department, has been making investigations lately, and a number of blood films which were sent to him by Dr. Burton, of Port Hedland, have been the subject of the research. The camels in question, it will be remembered, were brought to the State three months ago from India by Ibraham Mahomet, and have ever since been the subject of litigation. Consequently, they have remained confined to a limited area. The recent developments have put the Stock Department on their guard, and instructions have been issued that the quarantine regulations shall be rigidly enforced.

"The various trypanosome infections that cause these diseases have only been known for the past few years. The first investigated were those which caused the disease known as *surra,* in India and Malaysia ; then followed an investigation of those which gave the tsetse fly disease in South Africa, and subsequently those which caused the sleeping sickness in man. A good deal of investigation, of course, followed, and it was found that camels, horses, and cattle under certain conditions harbored *trypanosomes.* It was learned also that more than one species of *trypanosomes* infected these various animals, and were transmitted in most cases by means of suctorial insects such as the tsetse fly in Africa and various species of Tabanidæ. All the *trypanosomes* which infest animals do not necessarily cause disease. For quite a number of years—about twenty—the *trypanosome* has been known to exist in the rat. This was the first one which was discovered, but it rarely, if ever, causes any diseases in the rat. It is common in the rats of Perth, and has been found in rats in Queensland, and practically all over the world, wherever it has been looked for. Various kinds of birds harbor *trypanosomes* which do not produce any particular effect. As regards the camel, it is one of the animals which may be infected with *surra,* or may contain other *trypanosomes* which are not those of *surra.* Coming from a place such as India, one naturally regards with suspicion any animal such as camels which are imported. These camels, which were recently landed at Port Hedland, were accompanied by a veterinary certificate, saying that they were free from disease, and in one sense they might have been free from disease while in another sense they might prove a source of danger to animals here. It oftens happens that animals in the country where the infection is, harbor the parasites without really suffering to any extent from the disease. For instance, cattle bred and grown in a tick-fever country are practically immune from the disease, although they may be a source of danger to other animals in a clean country if taken there. These camels, having a veterinary certificate, were allowed to land. As an additional precaution, it was thought well to make an examination of their blood to see whether, by chance, any of them should be harboring the *trypanosomes* or other parasites. This examination of the blood is a long process, and a number of blood slides that were sent down were examined without any trace of the *trypanosomes* being found. At last two slides were found in which *trypanosomes* were fairly numerous. The question arises whether the camels which were brought over from India or other parts during the last 10 or 20 years are infected with *trypanosomes.* Such an examination, as far as we know, has never been made in Australia. It is a matter that affects the whole of the Commonwealth, and the other States which have camels should ascertain whether *trypanosomes* exist in them. It may be that a small percentage of those contain the parasite, but, as far as is known, no ill-effects have followed. As far as investigations have gone, it is impossible to say whether the *trypanosomes* which are present in these camels are the *trypanosomes* which cause *surra,* and so would be a source of danger to other animals. That is a matter which is being investigated. In the meantime every precaution is being taken to prevent the possibility of the spread of the disease."

"Is there any occasion for alarm ?" the doctor was asked.

"Not the slightest," was the answer. "In all probability some of the other camels which have been previously imported have been so infected. Yet it is a matter that requires thorough investigation. This investigation will also include the collection and the examination of the biting flies, which are responsible for the transmission of the disease. It may be found that these flies do not exist in sufficient numbers in this State."

GOVERNMENT LABOUR BUREAU.

JUNE REPORT.

Mr. J. B. Hitchens, officer-in-charge of the Government Labour Bureau, reports as follows on the operations of the Bureau for the month of June, and also for the half-year ended June 30, 1907:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 603. Of this number 327 were new registrations and 276 renewals, *i.e.*, men who called who had been registered during the year prior to the month of May. The trades or occupations of the 603 applicants were as follows:—Labourers, 177; handymen, 66; farm hands, 47; handy lads, 44; carpenters, 35; cooks, 21; bushmen, 20; painters, 11; plumbers, 10; drivers, 10; engine-drivers, 9; gardeners, 9; miners, sawmill hands, and station hands, 7 of each; blacksmiths, clerks, dairymen, fitters, and hotel hands, 6 of each; kitchenmen, orderlies, and yardmen, 5 of each; caretakers, 4; grooms, 4; bricklayers, plasterers, and seamen, 3 of each; and 61 miscellaneous.

Engagements.—The engagements for the month totalled 172. The classification was as follows:—Labourers, 32; handymen, 26; farm hands, 25; bushmen, 13; handy boys, 11; gardeners, 7; dairymen, 6; plumbers, 6; carpenters, 5; fencers, 5; farm lads, 4; cooks, market gardeners, and plasterers, 3 of each; and 23 miscellaneous.

Kalgoorlie.

Registrations.—There were 25 new registrations and 27 renewals. The classification was as follows:—Labourers, 17; handymen, 10; canvassers, 10; handy youths, 3; clerks, 3; cooks, 2; and 7 miscellaneous.

Engagements.—There were 17 engagements, viz.:—10 canvassers, 6 labourers, and 1 clerk.

The female servants who called numbered 28. The new registrations were 13, and the renewals 15. The classification was as follows:—Generals, 9; waitresses, 6; cooks, 5; charwomen, 2; laundresses, 2; barmaids, nurses, housemaids, and housekeepers, 1 of each.

There was one engagement, viz., one general.

Northam.

Registrations.—The applicants for employment numbered 34, classified as follows:—Labourers, 13; farm hands, 6; handymen, 4; chaffcutter hands, 4; cooks, shepherds, engine-drivers, grooms, clearers, mechanics, and lady-helps, 1 of each.

Engagements.—There were 16 engagements, classified as follows:—Chaff-cutter hands, 8; farm hands, 3; handymen, 2; cooks, shepherds, and engine-drivers, 1 of each.

Women's Branch, Perth.

Registrations.—The women who applied for work numbered 154. There were 75 new registrations and 79 renewals. The classification was as follows:—Generals, 36; laundress-charwomen, 29; housemaids, 22; cooks, 18; housekeepers, 14; useful girls, 9; waitresses, 7; light generals, 7; lady-helps, 4; nursemaids, 3; cook-laundresses, 3; pantrymaids, 1; teachers, 1.

Engagements.—The engagements numbered 45, classified as follows:—Generals, 21; laundress-charwomen, 12; light generals, 3; housemaids, 3; cooks, 2; useful girls, housekeepers, needlewomen, and nursemaids, 1 of each.

General Remarks.

At the Central Office, Perth, 603 men called during June. This total is 55 short of the number for May, and 19 short of that for June last year. The engagements numbered 172, this being 37 short of the total for May, and 25 in excess of that for June last year.

The number of individual men who applied for work at Perth from 1st January to 30th June was 3,103, as against 3,133, or 30 less than that for the corresponding six months of last year. The engagements for the half-year were 1,526, which is the highest total reached for the first six months of any year since the inauguration of the Bureau in 1898, the next highest total being 1,356 in 1905, which is 170 short of this half-year's total. Comparing the engagements with the corresponding period of last year, the increase is 189. There were 1,243 by private persons, this being 21 in excess of that for last year; and 283 from Government Departments, which is 168 in excess of last year's total.

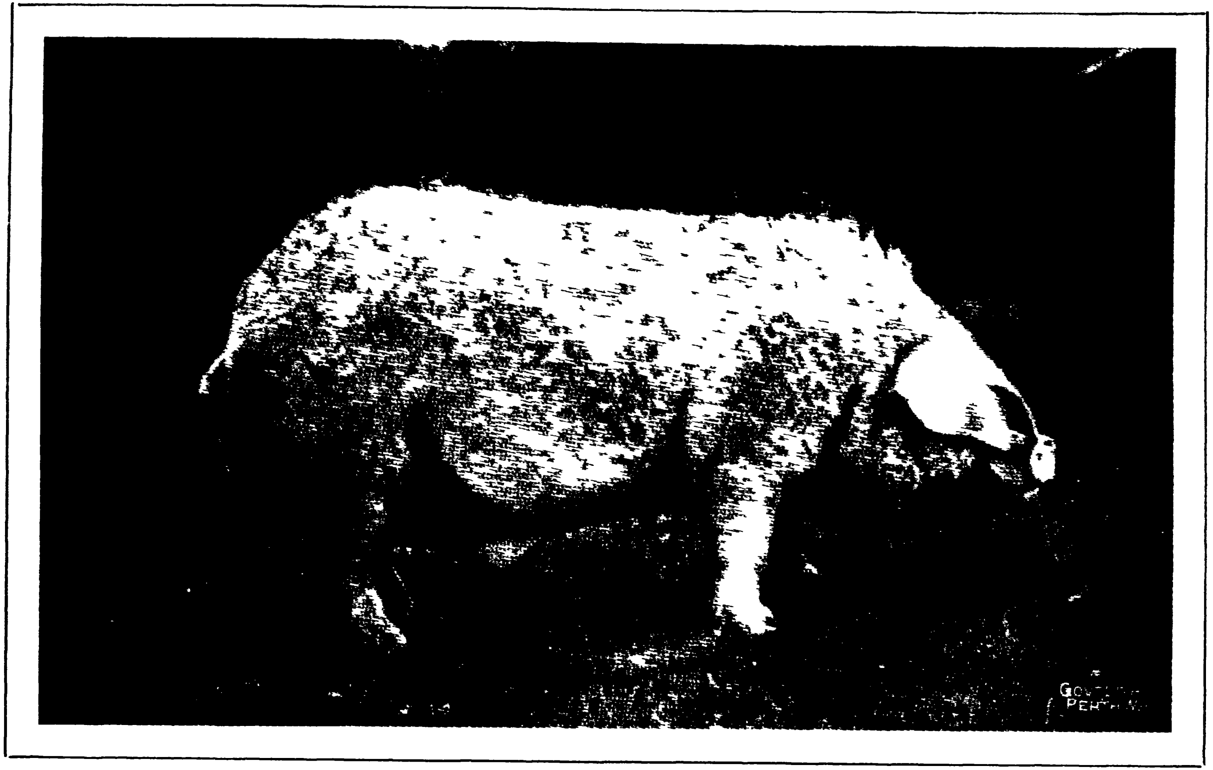
At Kalgoorlie the registrations during the half-year numbered 220, and the engagements 51, being 190 and 29 respectively short of the totals for the same period of 1906. The women who registered during the six months numbered 74, and the engagements 4, being 83 and 25 respectively short of the totals for the same period of 1906.

At Northam, during the period under review, 213 men registered for employment, and there were 111 engagements.

At the women's branch, Perth, the number of women who called during the half-year was 673, as against 756, or 83 short of the total for the same period of last year. The engagements were 413, being 51 short of that for the corresponding period of 1906.

Railway Passes.

During the half-year, at the Central Office, Perth, there were 313 (239) men assisted by railway passes to employment, at a cost of £205 3s. 10d. Of this amount £126 16s., or 61½ per cent. (53½), has been refunded. Further refunds will be received, there being a number of agreements to refund fares advanced during June not yet due, as well as several others. An additional sum of £19 11s. 2d. was received as a refund for passes issued prior to the year. There were also 56 men and 23 women sent to work whose fares were forwarded by employers, the amount totalling £102 9s. 3d. (£77 9s. 5d.) At Kalgoorlie branch there were 39 (45) men assisted by passes at a cost of £37 12s. 5d. The fares refunded amounted to £21 19s. 3d., or 59 per cent. There was a further sum of £9 18s. 2d. received as a refund for passes issued prior to the year. The total number of persons supplied with railway tickets, either provided by the Government or employers, was 431 (373), at a total cost of £345 5s. 6d. (£294 19s.) Figures in parentheses are totals for the corresponding period of last year.



Lincolnshire Curly-Coated Pig
'Midville Bob' (2[illegible]3)

THE LINCOLNSHIRE CURLY-COATED PIG.

We are in receipt of Vol. I. of the "Lincolnshire Curly-Coated Pig Breeders' Association Herd Book," per favour of the Secretary, Charles Edward Williams Esq. For the information of our readers we reproduce two of the plates in order to give an idea of the kind of pig it is, and also take a few extracts from the Secretary's introductory notes. This pig is one rarely met with in these States.

"Although the breed is one that has been in existence for a very long period, certainly over a century and a half, yet, owing to the lax method of record adopted, much that would be of interest and of value to the present-day breeder has unfortunately been lost.

"In Youatt's time, midway in the 19th Century, this pig was well known and was one of the established breeds of the County, and it is singular that no effort has been made until now, by those who breed the pigs, to place their undeniable merit before the buyers and breeders in other districts and abroad.

"There is, however, any amount of evidence to be obtained from amongst the records of the history of the old yeoman families of Lincolnshire, who have tilled the soil of that County for generations, son succeeding father and grandfather, in many of the holdings.

"All through this long period of time indisputable evidence shows that the occupiers of the different farms in the County have always had swine of high merit.

"Our Fenmen and Marshmen are by far the largest breeders of pigs; many have bought other pure or cross-bred pigs to fatten, but all finally and emphatically declare that Lincolnshire Curly-Coated Pigs pay the best. They are frequently fed in the marshes in the open, in herds of 100 or more, and with no other shelter than that afforded by mustard or other straw stacks—and it is the opinion of all who adopt this method of feeding, that the animals are far better and healthier than when they are kept in warm covered yards. They come early to market as porkers or as large bacon pigs, and being a general purpose pig are practically fit for slaughter at any age.

"A point that is of the greatest importance to the Lincolnshire Curly-Coated Pig is this, that it is a breed which has been pure not for a few years, but for over a century. This means that it is able to transmit its valuable characteristics and merits to its progeny, with a degree of certainty that would not be the case were it *recently* evolved.

"The most successful breeders of these pigs are those that follow the old and well tried methods of management, *i.e.,* to let the animal graze and take care of itself during the summer months, and then with the addition of some sound corn and other necessary food, finish it off for the market.

"These pigs are generally farrowed in England in March and April, those not kept for breeding are fed, and at 9 to 12 months weigh up to 30 stones (14lbs. to the stone). The sows are prolific, make very good mothers, and are usually fed after having had one litter, and at 20 months old weigh

40 stones and upwards. In Lincolnshire—owing to the fact that so much pork is allowed to foremen, shepherds, herdsmen, and horsemen in lieu of wages—there is a good demand for large fat pigs. The labourer also who feeds a pig or two, for his own consumption, invariably chooses this breed to any other.

"As regards the points of the typical Lincoln Curly-Coated Pig, the animal should be white, and coated with *white* curly or wavy hair (odd blue spots are not unfrequently found upon the skin). Head not too long, nose *straight* and not dished, ears thick and pendant, but not falling over the eyes, with a fair distance between them, jowl heavy, shoulders deep and wide at heart, ribs well sprung, back straight and long, tail well set, the sides are deep reaching nearly to the ground, belly parts thick and the whole carcass well supplied with lean flesh, hams well filled to hocks and standing on short straight legs with plenty of bone.

"There are many who would be the last to admit the superiority of any other breed of pigs, but who at the same time are not disposed to give the hearty support they should do to the establishment of a herd book for the breed.

"Other breeds of pigs have had their herd book for many years. In each case success, or benefit at any rate, has followed. That this will be the result in respect to this one there can be no question or doubt."

The following is the scale of points, objections, and disqualifications:—

SCALE OF POINTS.

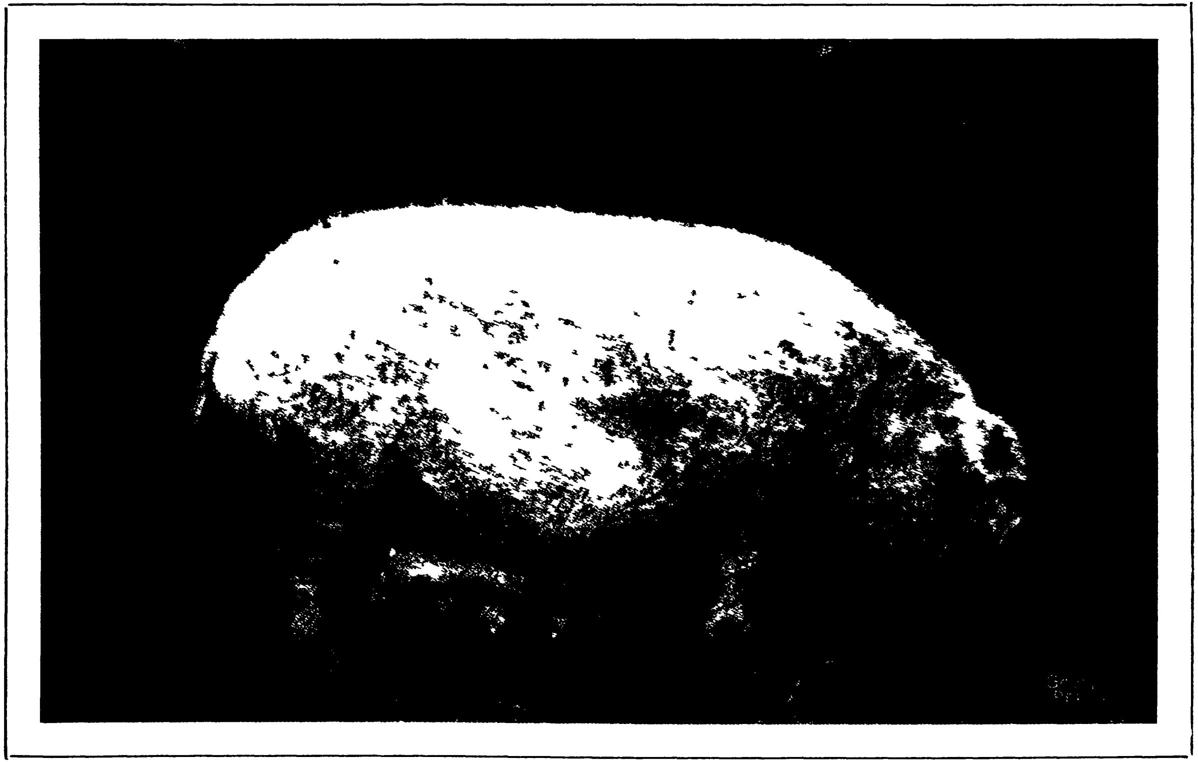
Colour	White	
Face and Neck	Medium length and wide between the eyes and ears	5
Ears	Medium length and not too much over face	10
Jowl	Heavy	3
Chest	Wide and deep	3
Shoulders	Wide	15
Back	Long and level	10
Sides	Very deep and ribs well-sprung	10
Loin	Broad	5
Quarters	Long, wide and not drooping	5
Hams	Large and well-filled to hocks	15
Tail	Set high and thick	3
Legs	Short and straight	[illegible]
Belly and Flank	Thick and well-filled	4
Coat	Fair quantity of curly or wavy hair	8
	Total	100

Objections.

Head	Narrow forehead.
Ears	Thin.

Disqualifications.

Ears	Pricked.
Nose	Dished or long.
Coat	Coarse, straight or bristly.
Colour of Hair	Any other than white.



Lincolnshire Curly-Coated Pig

“Midville Butterfly” (604)

DAIRYING IN THE ARGENTINE.

By J. A. Kinsella, Dairy Expert to the Department of Agriculture.

In dealing with dairying in the Argentine Republic, I propose to speak more on the practical side of the question, for the reason that most New Zealanders interested in this industry have already become acquainted with the theoretical part of what the Argentine is doing in this branch of agriculture, through the Australasian agricultural papers.

In the Argentine Republic only a very few years ago the dairy industry had practically no existence. The milk of the millions of cows which were in the country was utilised for no other purpose than for raising the calves. It must, however, be remembered that the Argentinos have always been producers of meat and hides, and even in the early days of the country they bred many good beef cattle.

At the present day we find the milk-supply business of many of the small towns, and even the suburbs of the large cities, such as Buenos Aires, carried on in a very primitive fashion. The milk for city and town supply is in some cases brought in in cans on horseback, the cans being slung at each side of the horse, and the motion of the horse causes the milk to be churned, thereby producing a soft butter. This butter is collected or gathered and sold to the clients ; and the milk, which can hardly be termed buttermilk, is also sold at a fair price, owing to the large percentage of fat still left in it. Many of the (native) Spanish people, strange to say, yet prefer this mushy soft butter to a good article produced in a butter-factory.

Another system of reaching the city milk-purchaser with what they term a pure milk is by driving the cows around the streets and milking them into small graduating measures or tin mugs in front of the houses. The cow is very often stopped a dozen times, or at least the process is carried out in front of a dozen purchasers' premises. The calf must always be tied to the leg of the cow, otherwise the cow will not give down her milk—so the owner of the cow claims.

All this, however, is being gradually done away with, particularly in the large city of Buenos Aires. In the latter city you will now find many fine places for drinking milk, milk shakes, etc. These places, as a rule, are painted white inside, and are kept scrupulously clean. The milk handled by the milk-shops is sent in from the large estancias (farms) in the country. They have also a few factories where milk is pasteurised and sterilised for city supply ; and there is at the present time a large company being formed, and an enormous building is being erected for the purpose of pasteurising and sterilising milk, which will serve nearly the whole of the city of Buenos Aires. I was also informed that it is proposed to manufacture maternised milk.

Before dealing with the actual butter-making part of the business, I shall describe roughly the methods of milking which prevail in most milking districts of the Argentine. The herds, large or small, are driven into what may be called milking yards, which are fenced with wire, generally a special woven wire manufactured in the Republic. Nearly all of the dairy cows in that Republic are milked with the calf by the mother's side ; as a rule, it is tied to the leg of the cow. Although the milking yards are not very large, you will very often find large herds of cows milked in them. The animals are milked for a great length of time in the same yards, until 8in. or 10in. of manure collects. They are then changed to another place, and this manure is allowed to dry, after which it is cut into squares and stacked like wood, and utilised for fuel. This system is carried on in districts where wood is scarce and coal dear. As can be imagined, after a heavy rainstorm, it is not a very pleasant business to milk cows in a milking yard such as described above. Of course, at a few of the "estancias" they have fairly decent places for milking.

There are two systems of milking—at least, two of them I have seen personally—and these systems seem to prevail nearly all over the milking districts of the Argentine. The idea seems to prevail amongst the native people that if the calf is taken away from the mother she will not give down her milk, and will, therefore, be rendered useless as a milker. I was astonished to find the people of the Argentine carrying on a milking business in this crude manner. When in Africa, I was not surprised to see the Kaffirs in Natal milking their cows in nearly the same manner as the majority of the cows in the Argentine are milked. The Kaffirs in Natal firmly believe that no cow will give milk unless the calf is with her at the time the milking takes place. The slight difference between the Kaffir system and that which is in vogue in the Argentine is that the Kaffir allows the calf to suck whenever he can get a chance during the process of milking. As stated above, there are two systems of milking in the Argentine. One is to allow the calf to suck a portion of the milk from the mother before the operator begins the milking process. After the calf has taken his share of the milk, he is tied to the mother out of reach of the udder. The other system, and one which is generally adopted, is to milk about two-thirds of the milk from the cow, and then to unfasten the calf and allow it to suck the balance. This latter portion of the milk, which, as a rule, would be about one-third of the milking, and which also contains the largest amount of butter-fat, the calf gets. I am quite sure that if this portion of the milk of the bulk of the Argentine cows was tested it would be found to contain 5½ to 7 per cent. of butter-fat. Butter-fat at 10d. per pound is pretty expensive feed for raising calves, particularly where a farmer is aiming to dairy for a profit.

The milking is done largely throughout the dairying districts by Bastous ; very few of the native "Spanish" people care to indulge in this kind of labour. The Bastous, I am informed, emanated from the Southern part of France. They are said to be a very industrious people, and make first-class milking hands. They seem a contented people and although they do not have the same facilities for entertaining as the people in the cities do, they always seem to have their own fun on particular holidays. The homes of the Bastous on the farms or estancias are not very elaborate ; any sort of a rough hut of slabs or sods, covered with a tin or thatched roof, answers the purpose. In such a comparatively mild climate as the Argentine they do not need nearly as much protection as we do in the cattle districts of our country, particularly in the South

Island of New Zealand. It can, therefore, easily be imagined what an advantage a country like the Argentine, as a dairying country, has even over Canada, United States, and Russia ; abundance of grass and water and sunshine almost the year round.

In the Argentine, silos for the curing of green fodder are a thing almost unknown ; there are a few, but they can hardly be called "silos." Where the cattle are fed on any fodder, it is principally alfalfa or full-grown maize. The maize is rarely ever cut green and fed to the cattle, as is done in other countries. In some cases the maize is fed to the cows in the ear. In most dairying districts of the Argentine it is, however, not necessary to provide much, if any, winter food for the cattle, grass being in abundance the winter through. I think the Argentine is the finest grass country in the world. This, together with the beautiful water, which can be obtained nearly all over the country at a reasonable depth, makes stock-growing cheap and easy. In many districts farmers do not require to sink more than 15ft. to 20ft. in order to strike a good supply of water.

Of course, in some places it is necessary to sink artesian wells. Where this is done the water supply is never-failing. It is also claimed by experts that the water supply, generally speaking, throughout the Argentine, is a very pure one. This may be accounted for in some of the districts which I visited by the fact that the water in many wells filters through sand-beds—that is, after you go down a certain depth. Take it all round, I think the Argentine has the clearest, and probably the best water for butter-making purposes that it is possible to find in any country.

The following is a list of the names of the butter factories in the Argentine, and their respective daily outputs, at the time of my visit at the end of March, 1904 :—

Name of Factory and Situation.	Daily output in pounds.
La Union Argentina, Buenos Aires City	30,837
La Tanilera, Tandil, on the Great Southern Railway ..	5,506
Progresso, Buenos Aires City	5,506
Co-operacion de Cremerias, Buenos Aires City ..	8,149
La Martona, Vicenete Casares, on the Great Southern Railway	4,405
La Union Gaudarense, Gaudara, on the Great Southern Railway	4,184
La Delicia, Florencio Varela, on the Great Southern Railway	1,762
La Vritel, Chascomus, on the Great Southern Railway	1,541
La Celia, Navarro, on the Great Southern Railway ..	1,321
Molino del Oeste, Buenos Aires	4,405
Lagranga Blanca, Marina, and other small factories in Buenos Aries Province, and the other Provinces ..	7,709

I give the above information so that our dairymen may know the size or output of the Argentine factories. For these statistics I am indebted to Senor J. B. Rospide, representative of the newspaper "Haritza."

As I mentioned at the outset, dairying in the Argentine is practically a new industry. The first separators were introduced in the years 1890 and 1891. The butter exported from the Argentine in 1891 was 1,320 kilos. Previous to 1901, salted butter in tins was an article of import into the Argentine. In 1895, 400 tons was exported; in 1901, 1,500 tons; and in 1902, over 4,000 tons. According to the latest statistics issued by the Ministry for Agriculture, the export of butter for 1903 was 5,696 tons, an increase over last year of 1,696 tons. The Argentine "Year Book" draws attention to the fact that if this rate of increase is maintained, an annual export of 50,000 tons may be looked for shortly. It further states that to obtain this it would only be necessary to milk half the available number of cows in the Argentine, which are estimated at nearly twelve millions.

"So important is this industry becoming," says the Argentine "Year Book, "it would be a mistake to consider it other than subsidiary and complementary to what must always remain the principal business of the country the breeding of cattle and sheep for exportation, either as live stock or through the freezing establishment; its development, in fact, should be regulated in such a manner that the abstraction of butter from the milk may not be permitted to interfere with the life and growth of the young animals on whose weight and quality so much depends." If it were not true that calves of good quality and weight could be raised less than a third cheaper on skim-milk with the addition of peameal, ground maize, or linseed-oil cake than they can be produced on butter-fat, I would then say the extract quoted was good advice to the farmers.

BUTTER-MAKING.

So far as the actual work of butter-making in the Argentine is concerned, the system adopted in most factories is somewhat different from ours in New Zealand. The bulk of the cream at most factories comes in what I would call an over-ripe condition—that is, for the butter-maker to have control over it, in other words, for him to be able to ripen it uniformly with a good starter.

The fact of the cream arriving at the factories in this condition may be accounted for by the following reasons: Firstly, dirty milking yards; second, dirty milkers; third, dirty, rusty cans. And the most dangerous source of infection, in my opinion, is the carrying of milk and cream long distances by rail in these rusty cans. A great deal of the milk is brought to the creameries in small cans on horseback. Large quantities of cream are also brought to the railway stations from the small estancias or farms in this same manner. It is an astonishing thing to see a native coming to a small siding or station with six or eight cans of cream slung from each side of the horse's back. They also very often take double that number of empty cans back with them.

Very few saddles are used by the natives in the Argentine. They have a sort of home-made arrangement which is composed of heavy bands around the body of the horse, and the top of which is made of strong leather; two rolls of some material covered with leather are faced on each side of the centre of the horse's back, and a large hook on one side, which permits of hitching the horse to a load of any kind by means of a chain or rope—a very handy arrangement indeed.

New Zealand dairymen will understand that it is not a good system of conveying milk or cream to a butter factory or skimming station after reading my remarks on the methods adopted for churning butter for city and suburban supply.

Now, getting back to the butter-making process again : I found that the grading of cream would hardly be possible, for the reason that you get so many hundred different qualities of cream at all degrees of ripeness, particularly at a large factory like La Union, where they turn out in the flush of the season about 20 tons of butter per day, and where they get the cream in from over fifty separating stations, mostly by rail, besides the many small estancias that forward cream direct. The grading and ripening of cream with a starter in the Argentine is, therefore, not practised very much. In most of the factories, with the exception of two or three, the cream is allowed to ripen on what might be called the self or chance-ripening system. Most of the factories are substantially built and fairly well equipped. The large factories have any amount of freezing capacity. The chilling of the cream is done by means of movable coils, through which cold water or brine is circulated. The vats are in nearly every case shallow, and the coils are worked up and down in the vat perpendicularly, not, like most of ours, on the horizontal principle. Generally speaking, the cream is not churned at nearly as low a temperature as we work on in New Zealand, the result being loss of fat in the buttermilk, and injury to the texture of the butter in the working process. Most of the Argentine butter which I examined, both in the country and on the African markets, had the appearance of being over-worked, and I was thoroughly convinced of that point after watching the process in some of the large factories. The Argentine butter is much paler in colour than the New Zealand article. This may be accounted for partly by the food eaten by the cattle, and, perhaps, the breed of cow may have something to do with it. Then, also, the large amount of friction given the butter in the working process tends to grease it and make it, as it were, have the appearance of hog's lard. A good deal of the butter exported is not salted. This latter is even paler than the salted butter. I have, of course, always found from experience that salt adds a little colour to the butter. While in Cape Town and Durban I learned from a number of dealers that the Argentine pale butter was very well thought of. It, however, only required a glance to see that New Zealand butter was the finest-made butter sent into Africa, but the mistake was that they did not get it there while it was newer.

I am in hopes that we may, by experimental work, get some method of reducing the high colour in our butter without ruining the body and texture, as the British expert buyer thinks so much of the latter. My advice to New Zealand producers in the past has been rather against the manufacture of unsalted butter in large quantities for export, on the grounds of the greater liability of deterioration in transit during the long voyage, as compared with fifteen days from the Argentine, or a few days from Denmark. The Argentine is differently situated and can afford to take the risk, for the reason that they can land their butter in London in such a short time compared with the time it takes our butter to reach the British consumer. This month (April) there is an arrangement being entered into which will enable the producers in the Argentine to land their butter in London in fifteen days, so when they get such a quick fortnightly service as this they can lay their butter down in the Old Country in a fairly fresh condition as compared with ours. The butter-boxes are not so good in the Argentine, the timber not being so suitable. Like the Canadian boxes, the sides, bottoms, and covers are often in three pieces, tongued and grooved. The Argentine people, however, have paid more attention to the question of making the boxes for the African market of much heavier timber, and also to nailing them better. I commented strongly on this matter when dealing with New Zealand butter shipments in my African Report.

During my hurried visit to the Argentine I had the pleasure of visiting two butter factories controlled by Lovell and Christmas and Mr. Henry Reynolds. The latter manages the business, besides buying from other factories for export. Mr. Reynolds was one of the pioneer dairymen in the Waikato, Auckland Province ; he has also the honour to be among the first to start butter factories on what could be called a good sound factory system in the Argentine. The first factory visited was the Progressò, in the City of Buenos Aires. This factory is quite close to the railway station, which makes it very convenient for receiving cream. It is equipped with a good plant and plenty of freezing power. At the time of my visit they were turning out about 5,500lb. of butter per day.

The other factory controlled by Mr. Reynolds is situated at Tandil, on the Southern Railway. I had the pleasure of spending a few days at this factory along with the manager, Mr. Gerlach, who, at one time, resided in New Zealand. At the time of my visit this factory was turning out about the same quantity of butter as the Central Factory at Progresso, in Buenos Aires, where the whole of the business is transacted. The factory at Tandil is a fine building, equipped with a good plant. The boiler is of Italian make, 80-horse power, fitted with a fuel-saving condenser, which permits of the water entering the boiler almost at boiling point. Mr. Reynolds informed me that this boiler was installed at a much lower cost than either an English or American boiler. They have also a very powerful engine and two Linde freezing machines. Four large churns are placed in a row in the butter-making room. They are of American make, well known to me, called the "Squeezer." The butter is churned, worked, and salted in the churn. The cream is elevated into shallow vats, where it is cooled down by means of movable coils on the same principle as that in use at the Central Co-operative Factory at Christchurch. Although this factory was turning out less than three tons per day at the time of my visit, it has a capacity of 10 or 12 tons per day. In connection with the capacity question, I find the very reverse in the Argentine from what I have experienced in New Zealand—viz., that instead of building the factories too small to cope with even the second year's business, they build and equip for about four times the first year's capacity, and I believe it pays in the end.

Although they ship the butter regularly to the Central Factory at Buenos Aires, they have a freezing chamber capable of storing 2,500 boxes of butter in case of emergency. Although Mr. Reynolds has been in the country for about five years, he does not seem to give his pointers on butter-making away to his opponents. I found the system adopted in his factories more on the lines of New Zealand butter-making. In referring to Mr. Reynold's business I cannot pass without stating that I am deeply grateful and very much indebted to him for his kindness to me during my stay in the Argentine. Mr. Reynolds did not spare time or money to assist me in gaining information ; he was also able to secure passes over one of the railways for me.

The most important factory in the Argentine, and perhaps the largest butter factory in the world, is La Union Argentina, which is situated in the City of Buenos Aires. The cream comes into this factory from three different Provinces—viz., those of Buenos Aires, Santa Fé, and Entre Rios. This factory, in the flush of the season, turns out about 20 tons of butter per day. At the time of my visit, in March, they were making close on 16 tons of butter per day. Cream is received from over fifty skimming-stations, besides the large number of estancieros who send their cream in direct to the factory. The skimming-stations are, generally speaking, pretty well equipped, but not properly managed so far as close and careful skimming is concerned. The separators used in the Argentine are of the Alexandra make, the Sharples Tubular, the Baltic, and a very few Radiators. The Alpha De Laval predominates in the Argentine, but so far as I could learn the tubular Sharples machine takes a lot of beating. La Union Factory is fitted out with an enormous amount of steam, engine, and refrigerating power. The freezer is of about 50 tons capacity. The boilers are upwards of 100-horse power. Eight large trunk churns are installed ; the churns are practically the same as those in use in New Zealand. The butter in the butter-making room is worked by two enormously large circular butter-workers, and they work four times as much butter at one single working as we do in New Zealand.

After taking careful note of the building and plant of La Union I came to the conclusion that with very little extension of the butter-making room nearly double the quantity of butter could be turned out with the present boiler, engine, and freezing power. In other words, in order to make 35 or 40 tons of butter per day the extensions need not be on a larger scale, or very expensive. In La Union they have splendid freezing and chilling chambers, which are capable of holding large quantities of butter in case they need to store at any time.

In 1902, this company issued an illustrated pamphlet in Spanish, giving a description, or, rather, the history of the company. I have much pleasure in quoting a few particulars from this pamphlet. They estimate, in connection with this concern, the rent of one cuadra (150 square yards) of camp land at $15 per annum. The care and milking of 120 cows requires three practical men. The wages of each man is $35 per month, with board and lodging. Ninety-five per cent. of the cows are of a Durham cross and type. Taking as a base the production of 13,000 kilos. per day, already reached by the company, the following data will show the importance of the establishment : The daily output represents 312,000 litres of milk obtained from 81,000 cows, the value of which is $5,265,000, and the rent of which amounts to $800,000 per annum. In the dairies contributing to the production of the society are employed 2,025 men. The management and staff of the factory and branches is composed of 156 employees.

The above company was registered in June, 1899, statutes reformed in October, 1901 ; capital, $500,000 in 5,000 shares of $100 each. No shareholder can hold more than 100 shares. The business is conducted on co-operative lines. In 1901 the company acquired the rights and properties of the Campania Escandinavia Argentina (Limited). The directors are Senor A. Yrazu, President ; G. Munoz, Manager. The Vice-President is Senor Agustin de Uribe. The board of directors is composed of eight directors in addition to those already mentioned ; amongst them are Dr. Augusto Tiscornia and Senor Martin Pezoimburu.

I wish to express my thanks to Senor Yrazu, the President of the company, for his kindness in showing me over the whole premises.

It is claimed that the increase in the production of butter in the Argentine between 1891 and 1901 was over one hundred and fifty fold; in Australasia for the same period, according to Mr. Bateman, it was only thirty fold. In 1891 only 1,320 kilos. of butter was exported from the Argentine, while in 1902, 4,125,000 kilos. was sent abroad.

Most of the cream is purchased on a commercial butter basis; that is, the estancieros have not become educated to accept so much per pound of butter-fat according to test. They demand so much per pound of butter, with 10 or 10½ per cent. added to the Babcock test, whether the manufacturer can turn out sufficient commercial butter to correspond with the test or not. This, in my opinion, is a wrong and unfair basis of carrying on a dairy business from the manufacturer's point of view, for the reason that a large quantity of the Argentine cream is injured in transit, thereby rendering it impossible to get a decent over-run. We in New Zealand think we have trouble with the testing and with our suppliers, but I believe we have the finest system of testing and paying for butter and cheese in the world; further, I think we have the most contented lot of factory suppliers I have ever seen. In the Argentine nearly every large estanciero has a milk-tester. The one in use all over the country is the Gerber. The client sends in a slip with his cream each day, giving the test as made at the estancia, and if the factory's test does not come up to this there is trouble. They, of course, do not take into consideration the obsolete methods of carriage, etc., which the cream is subjected to, which nearly always causes the cream to become partly churned, and which renders it impossible for the butter-maker to get a 10 per cent. over-run according to the farmer's test. I have almost become disgusted with articles appearing in dairy papers with reference to 16 to 19 per cent. over-runs. When over-runs of this kind are made there is, in my opinion, as a rule, cheating in the weighing going on, and too much water and salt left in the butter.

In the Argentine, where the farmers or estancieros do not possess plants of their own, they deliver their milk to the nearest skimming station. Then again, where the cream is skimmed or raised by deep setting for account of the senders, or is purchased outright, in either case it is carted or railed to the factories at large cost for carriage. I have no idea when the proper system of payment for milk will be adopted in the Argentine—that is, by paying on the butter-fat basis. It is estimated that there are about two hundred and twenty skimming stations in the Argentine Republic, where skimming by centrifugal machines is done.

This business covers four provinces—Entre Rios, Buenos Aires, Santa Fé, and Cordoba.

In dealing with the dairy industry of the Argentine I have endeavoured to refrain from making comparisons between it and New Zealand and Australian methods. I reckon that it is my duty only to give the true practical facts as near as possible as I found them, and then to let our farmers and dairymen make the comparisons and judge for themselves as to what this enormous country is capable of doing in dairying and what we have to compete against. It only requires a run over the various lines of railways to convince a person of the enormous extent of the country and its vast richness. On each side of the different lines you will see thousands of fat cattle and sheep, and it must be remembered that at the time of my visit it was their autumn, when one would expect to find the grass partly dying out ; but so far as I could see the pastures were in excellent condition, and late crops on the grand fields of alfalfa and maize were indeed a sight.

One can imagine the carrying capacity of the Argentine when it is realised that the province of Buenos Aires alone is two and a half times as large as the wonderful New York State in North America. It is estimated that this province alone has about 10,500,000 head of cattle, over 82,000,000 sheep, and about 2,230,000 head of horses. In 1901 the total value of agricultural and pastoral products from this province alone was $740,000,000. We must, of course, figure on the fact that this province has a population of about 1,300,000 people. I am strongly of the opinion that if the people of the Argentine would adopt a better system of milking yarding, and feeding the cattle, they would in a very few years turn out 50,000 tons of butter instead of 6,000 tons. While in the Tandil district I met a Mr. A. Leanes, who has had a lot of experience in dairy farming in the Argentine. He is now on an estancia of 20,000 acres, and has a thousand cows. At the time of my visit he was milking between five and six hundred cows. He sends the cream to a butter factory, and utilises the skim-milk for pigs, etc., on the farm. Senor Leanes informed me, upon inquiry, that the value of his land was about £2 10s. per acre, and he further stated that two acres of the grazing land would carry one cow—that is, the year round. This land is situated about two hundred miles south of the city of Buenos Aires. I found it almost impossible to get from a farmer or estanciero the exact profit made per cow on the estancias.

NITROGENOUS LIME.

Nitrogen forms, as is generally known, besides phosphoric acid and potash, the chief ingredient of plant food. It is contained in the air in vast quantities, but there are only very few plants the so-called *Leguminosae,* that benefit by these supplies direct. To most of them it must be given in the form of a manure, either farm-yard or artificial, which contains a certain percentage of nitrogen. Naturally the problem of fixing the vast nitrogen supplies of the air by means of a chemical process has occupied the thoughts of scientists from the earliest stages of artificial fertilising, but it is only quite recently that it has been solved successfully.

This difficulty once overcome, and the efficiency of the new fertiliser being proved beyond doubt, it is in the interests of the public interested in agriculture to be acquainted with all particulars touching the application and the effects of Nitrogenous Lime, as the newly invented manure is called.

However, before entering upon this matter, we will touch a question that not unreasonably may be raised as to whether we actually need a new fertiliser (nitrogenous), or whether the manure usually employed will suffice to satisfy the demand in the future, and whether the prices of the Nitrogenous Lime compares favourably with the other nitrogenous fertilisers.

Nitrate of Soda, though in existence in enormous beds, will be exhausted in a time not far off, the more so, as the ever-increasing demand results from year to year in an enhanced output of the mine, while the existing supply does not increase them to any appreciable extent.

The production of Sulphate of Ammonia, is kept within the limits of that of coal and gas, and cannot be raised in proportion to the demand, which largely exceeds the supply.

The same refers to the Organic Manures, which only suffice to cover a comparatively small portion of the requirements.

Under these circumstances, we do not say too much when stating that the introduction of a new nitrogenous manure is not only highly desirable, but will become an absolute necessity in the future.

Of course, there are other questions that require paramount consideration before we can arrive at the conclusion that Nitrogenous Lime is actually the manure apt to satisfy all the expectations justifying its introduction on a large scale.

However cheap a manure may be, the unit of valuable ingredients will come far too expensive on a long transit, unless it has a sufficiently light percentage. From that point of view, the Nitrogenous Lime compares well with its rivals, because it contains, besides, 19.5 carbon ; 6.5 chlorine ; 45 per cent. lime ; 20 per cent. nitrogen, same as Sulphate of Ammonia, and against 16 per cent. of nitrogen in Nitrate of Soda. Consequently, transport charges will not tell more on the Nitrogenous Lime than on Sulphate of Ammonia, whilst at the same time, its large percentage of lime highly benefits the mechanical condition of the soil, which in that way makes it certainly preferable to sulphate, which does not contain so much.

Equally important, in fact, perhaps more so, than the foregoing, is the consideration of price which, however, lets us arrive at an equally favourable result on the new manure.

Basing on Sydney prices, a comparison shows as follows :—Sulphate of Ammonia, 20 per cent., £15 per ton, 15s. per unit ; Nitrate of Soda, 16 per cent. £14 per ton, 17s. 6d. per unit ; Nitrogenous Lime, 20 per cent., £14 per ton, 14s. per unit. This will not need further comment as the figures speak for themselves.

The mechanical condition of the manure is all that can be desired. It is exceedingly free and easy running through the drills, and does not cake. At the same time it mixes with nearly all other manures, chiefly Potash and Thomas's phosphate, whilst it should never be mixed with Super. on account of its high percentage of lime. We could name a series of most favourable experiments carried on at reliable quarters, in Germany, but we desist from it because we think that farmers naturally only attach importance to trials made on their own soil. Unfortunately such results are not available yet, the importation of the new manure only being of a recent age. However, from the favourable conclusions that we have arrived at in the foregoing paragraphs, the farmer interested in artificial fertilising, should not fail to make a test on his own soil, and we are sure that the results will prove the theory maintained.

As said before, experiments on Australian soils have not been carried out so far, but nevertheless, a few hints as to the use of the new manure, which have been gathered in Germany, may be welcome. Nitrogenous Lime is not suitable for Organic soils, which are sour and water logged, nor for light sandy soil of a sour reaction. On all other soils it has proved to be very effective, and not in the least way detrimental to plant growth, unless applied at too early a stage. As regards time of application, the following rules have been arrived at :—

The most suitable time for using it is about a fortnight before sowing the grain or seed, which should be well mixed with the soil by hoeing or raking.

Top-dressing is not advisable, at least not at too early a stage of the plant, as the Caustic Acid of the manure might have a detrimental effect on the plant's growth. The greatest efficiency of the manure will be attained when given just before a shower of rain, which make it dissolve and mix with the soil very readily.

As regards quantities to be applied to the various crops, the following hints are given :—

Plant.	Quantity in Cwts.	Time.
Wheat	1 to 2 ...	Fortnight before sowing on light soil, half of above, remainder as topdressing.
Rye	¾ to 1½ ...	Same as wheat.
Barley	¾ to 1½ ...	Same as wheat.
Oats	1 to 2 ...	Same as wheat.
Maize	1½ to 2 ...	Same as wheat.
Potatoes	1 to 2 ...	Fortnight before sowing.
Sugar Beets	¾ to 1½ ...	Same as potatoes.
Turnips	¾ to 2 ...	Same as potatoes.

COLD STORAGE POULTRY FALLACIES EXPLODED.

By Dr. Henry A. Higley.

(*Concluded.*)

It is also stated in this quotation from McFarland's Pathogenic Bacteria that the virulence (that is, the disease-producing power) of these bacilli is increased by passage through animals. It might, therefore, be claimed by the supporters of this measure that although these bacilli in the intestinal tract of man were harmless, by growing in the intestinal tract of poultry and game their virulence was increased, so that when eaten by man they would be harmful to him. Such a statement, however, is in no way truthful. While it is true that pathogenic bacteria may be increased in virulence by passage through these animals, it is also true, in order that such an increase of virulence may take place, it is necessary that some reaction or disease must be produced in the animals through which the bacteria are passed. Now, these bacteria produce no disease in these chickens, for we are here dealing with perfectly healthy fowls during life, not in any way with diseased. So that under these conditions no increase in virulence could take place by the presence and growth of these bacteria in the intestinal and thoracic tracts of healthy poultry and game. Not one line of accredited bacteriological evidence can be produced to show that any increase of virulence could take place under these conditions. I sumbit the following quotation from Park's Pathogenic Bacteria and Protozoa, page 147, to substantiate the truth of this statement :—"Inoculate a rabbit with a large number of streptococci, and produce blood poisoning. From this rabbit now inoculate another, and we find that a smaller number produces the same effect, and so on, until the virulence has been so increased that a very few streptococci will produce the same result."

"2. A set of experiments purporting to show the presence of the bacterial invasions claimed."

Of course, all experiments in this respect are without any value unless it first be demonstrated beyond all doubt that these bacteria and their toxines are harmful when eaten by man. Since the supporters of this measure have in no way established this point, all of their experiments are absolutely without meaning, with regard to the question here under discussion. But let us look further into these experiments, and see whether they will hold water when applied to the question under discussion here.

The first experiment is that of one hundred chickens bought in the markets of the State of New York, in the edible portions of which it is claimed that these bacteria were found. Is anything mentioned in this experiment about the condition of these chickens with respect to putrefaction when they were examined ? Not one word. Nothing at all is said about that ; and yet we know from the established facts of bacteriology, as presented in this article, that if these bacteria were there as claimed, these chickens must have been kept some time at a temperature above 5deg C. (41deg. F.), and that such a temperature as that would much more permit the growth of putrefactive bacteria, and that if the bacteria claimed were present, the chickens must have been undergoing putrefactive changes. So that nothing to the point is proven by this experiment, except that the observations must have been made upon putrefying poultry, which cannot now be legally sold, and against which the claims of the supporters of this measure are not aimed.

The second experiment purports to show that a chicken, killed, picked, and placed, undrawn, in an icebox at 40deg. F., showed this bacterial invasion at the ninety-sixth hour after being placed in the icebox. An experiment performed by me shows that under the conditions set forth in this experiment the bacterial invasion takes place in six hours instead of ninety-six hours. This experiment has no application to the question involved here. This is not the way that poultry is preserved in the poultry trade. If such a practice were followed by the shippers of poultry, all of their poultry would putrefy before it could possibly be shipped and sold. Every practical poultry man knows that unless you withdraw the animal heat from poultry before putting it in cold storage it will undergo rapid putrefaction, and cannot be sold. So that this experiment is entirely without application to this subject, because it does not meet the practical conditions as they exist.

The third experiment purports to show that a chicken, killed, picked, and placed, undrawn, at a temperature of 70deg. F., showed this bacterial invasion at the end of the eighteenth hour. Of course it did, but that has nothing to do with the question involved here. If it showed in its edible portions the bacteria involved here, it would much more show the presence of putrefactive bacteria and be undergoing putrefaction. So that this experiment is entirely valueless, because it in no way represents the conditions which have to be met in the poultry trade.

The fourth experiment purports to show that a chicken, killed, picked, drawn in thirty minutes after death, and placed at a temperature of 40deg F., does not show this bacterial invasion even at the end of twenty-eight days. Of course it does not, because by drawing it the animal heat has been very largely removed, and then by placing it in the ice box at 40deg. F. it was quickly brought within this temperature. In this experiment the observer has done just exactly what is done, what has to be done, practically in the poultry trade, by placing undrawn chickens in ice water immediately after killing to withdraw the animal heat. This experiment simply proves that if the conditions are met which have to be met in the poultry trade of withdrawing the animal heat immediately after death, no bacterial invasion can take place. This experiment is no argument in favour of drawing poultry to prevent bacterial invasion. It simply shows that the animal heat must be withdrawn at once after killing—this has to be complied with now by the poultry shipper in order that his poultry may arrive at market and be profitably sold. This Bill says that poultry must be drawn within twelve hours after death. Any fowl drawn within thirty minutes after death has no relation whatever to a fowl drawn one to twelve hours after death. Because a fowl drawn thirty minutes after death does not show this bacterial invasion, it is no proof whatever that a fowl drawn one to twelve hours after death will not show the invasion. So that for this reason this experiment in no way applies to the measure under discussion here.

The fifth experiment purports to show that a chicken, killed, picked, drawn, and placed at a temperature of 70deg. F., showed no bacterial invasion at the end of fourteen days, but did show the growth of putrefactive bacteria, which it is stated are harmless. How long since putrefactive products fourteen days old are harmless to eat? This experiment shows nothing at all to the question in point, but if it shows anything, it shows that drawn fowl kept fourteen days at a temperature of 70deg. F. is undergoing putrefaction. What has that to do with the preservation of poultry and fowl by cold storage?

The analysis of all these experiments shows that they are all entirely irrelevant to the question under discussion here.

No proof is produced that these bacteria or their toxines are harmful when eaten by man.

No proof is produced to show that these bacteria are present in the edible portion of poultry which is free from putrefaction.

No proof is produced to show that this bacterial invasion takes place under the conditions existing in the killing and shipping of poultry.

Not a single poisonous ptomaine to man has been obtained from the edible portions of any of these fowl.

The entire proof in these experiments is delusive, and not at all to the point under discussion here.

"3. A set of cases of supposed victims of infected poultry."

In none of the cases reported by Dr. Cavana and the one by Dr. De Forest is there any scientific evidence whatsoever that the illness or death of these persons was caused by the poultry or game which they ate. They are said to have been taken sick after partaking of a meal at which they ate poultry or game but not one single statement is made to show that the poultry or game was the cause of their sickness. Considering the millions of people who eat cold stored undrawn poultry and game, it would indeed be astounding if some cases could not be found in which a few persons were taken sick after eating a meal at which poultry and game were partaken of. In any of these cases, in order to show that the poultry or game was the cause of their illness, it would be necessary to prove that the poultry and game of which they had partaken contained substances poisonous to man; and, further than this, so far as the contentions of the supporters of this measure are concerned, it would be necessary to show that such poultry and game was free from putrefaction, and could now be legally sold under the laws of the State of New York.

Dr. Higley's Own Experiments.

Observations which have been conducted by me relative to this subject, in accordance with the established rules of bacteriological technic, were as follow :—

1. Healthy chicken, killed, picked, and *at once thrown into ice water. Ten cultures made at once from different parts of the edible portions. All* cultures came out sterile, showing no bacteria present in such portions. At

the end of three hours in ice water the chicken was packed in ice, and ten cultures made at twenty-four hours' intervals for five days. All cultures came out sterile, showing no bacteria present.

2. Same as observation No. 1, except chicken was properly drawn eighteen hours after killing, being kept in ice water meanwhile ; same result.

These two experiments show that under the conditions which I employed, and which I submit accurately, approximate the conditions existing in the killing and shipping of poultry for the trade ; no difference exists between drawn and undrawn poultry with respect to the invasion of edible portions of bacteria from the intestinal tract.

3. Frozen fowl, undrawn, from Iowa, killed and frozen nearly six months. No putrefaction ; twenty-five cultures from edible portions, all sterile.

4. Same as No. 3, except another fowl of same origin used. No putrefaction ; same result.

5. Fresh killed fowl from Missouri ; seven days' railroad to New York. No putrefaction ; twenty-five cultures, all sterile.

6. Same result as No. 5, except another fowl of same origin used. No putrefaction ; same result.

Running all through the contentions of the supporters of this measure, there is the implication that whereas undrawn fowl contain large numbers of these bacteria in their intestinal and thoracic cavities, drawn fowl do not contain them on the walls of their intestinal and thoracic cavities. This, however, is far from being the truth. It is extremely improbable to suppose that in drawing a fowl whose intestinal and thoracic cavities contained such large numbers of these bacteria, it would be impossible to avoid contaminating the walls of these cavities.

A general conclusion to the whole matter involved in this discussion may be stated as follows :—

All bacteriological evidence conclusively proves that the edible portions of healthy, dead, undrawn poultry and game do not contain any bacteria toxines, or ptomaines that are harmful when eaten by man so long as such poultry is kept free from putrefaction. That poultry that goes into cold storage in good bacterial condition comes out in exactly the same condition that it went in, so long as the temperature of the poultry is kept low enough to prevent the growth of putrefactive bacteria, and, finally, that the longer poultry remains frozen the less bacteria does it contain.

BACON CURING.

In response to several inquiries for home-curing bacon, the following particulars are published as recommended by the Hon. John Lewis, of South Australia :—

"Cut the carcase as neatly and as shapely as possible. and use the following condiments in the proportions given for every 100lbs. of meat ;— Saltpetre (well powdered), 2ozs. ; Common Salt, 3lbs. ; Dark Brown Sugar, 3lbs. ; Allspice, 1lb. ; Carbonate of Soda, 1oz. Mix this well together. Rub the meat with one pound of honey, then rub in two-thirds of the mixture mentioned, and place in a tub in a cool, well ventilated place—flesh side up. After 24 hours turn and rub again with a little more of the unused mixture : then during the next fortnight, turn and rub every other day five or six times, using some of the mixture each time. Then closely pack in a vat, and keep it immersed in brine. After three weeks' pickling take it out, scrub and clean with hot water, soak in cold water for two hours, and hang up in a dry draughty shed. If flies are troublesome stop up cracks and crannies with lard, and dust over with a little pollard. After a fortnight it will be ready for smoking. The smoke should be applied as cool as possible. For two pigs a smoke-house could be made from four sheets of 6 x 3 galvanised iron. Three of these are nailed to upright jarrah posts, and the fourth made into a door. The top is covered closely with another piece of iron. This should be constructed as smoke-tight as possible. The smoke is generated in a fireplace 10 to 12 feet away, communicating with the centre of the chamber by means of a trench, nine inches wide and a foot deep, which is covered with iron or other material. A sheet of flat iron is placed on four bricks over the opening of the flue inside the chamber to distribute the smoke and keep the heat from the bacon. Make a small fire and place moist sawdust, or other smoke-making material thereon, which can be aromatised by means of Juniper seeds, or whatever else may be deemed suitable. The South Australian German colonists use stinkwort for that purpose. The hams and sides are hung close to the top in rows a few inches apart. It usually takes about eight or 10 days to smoke properly—making a smoke every other day. After smoking, the hams and hands are gone over with lard and pollard when likely to be attacked with flies. They are then placed in calico bags, tied tightly at the top and hung in a warm place, such as a kitchen. It is then ready to be packed away in either dry bran or sawdust, and it should be examined every six or seven weeks, when, if found to be sweating, it is rubbed dry with a cloth to prevent mildew, some chaff can then be added to the sawdust or bran. Too much heat will cause the fat to melt and turn rusty ; too much dampness will cause it to sweat and decay. Bacon cured by this process will keep for many years and sell well.

GARDEN NOTES FOR AUGUST.

By G. Chitty Baker.

With the advent of August we may look for a few warm days, and the more rapid growth of plants. In the districts north of Perth preparations should be made for the early planting out of tomatoes, as it is the crop first in the market that obtains the best prices.

So soon as the heavy rains are over practically all and every kind of vegetable can be sown or planted. Every barrow-full of farm-yard or stable manure that can be obtained should be carted on to the ground ready for digging in. In loose sandy soils work may be carried on every day that is fine. On stiff clay ground, however, care must be taken, or such a pug will be generated that after a few hot days a pick will be required to break it up. It is on such stiff soils that farm-yard manure is of so much value, preventing as it does the too close adhesion of the soil particles that is so undesirable and injurious to the young rootlets.

Asparagus.—As soon as the plants begin to shoot they should be planted out in land that has been previously prepared by digging about 30 inches deep, and well mixed with stable manure. All damaged parts of the root should be cut off before planting, and the roots well spead out in the soil, and not bunched up together ; cover with fine soil so that the crown of the plant is about two inches below the surface. Where beds are alreadily-estadlished they should be covered to a depth of six inches with well-rotted stable manure, and give the bed a good supply of liquid manure ; this will cause a fresh growth of thick white shoots.

Artichokes (Globe).—Plant out any suckers or young plants from the seed-bed. They require a rich or well-manured soil.

Artichokes (Jerusalem) can be planted freely this month. They are hardy, are a good wholesome vegetable, and if there is a surplus supply they are excellent for pigs. Plant in drills three feet apart, and about 18 inches apart in the drills. A plot of ground should be selected for this crop where it may remain for two or three years. It is sometimes very difficult to get all the tubers out ; no matter how much care is taken there is always enough tubers left in the ground to produce a second crop.

Beans (Broad).—The last sowing should be made this month, keeping them well apart, say 5ft. between the rows. Early potatoes should be planted between the rows, the beans as they grow forming a protection ; saladings may also be sown to advantage in the same way.

Beans (French or Kidney).—In the warmer districts the plants will be well forward. They can be planted anywhere as soon as danger from frost is over. Obtain seed of good varieties, and plant out in rows two feet apart in land that has been well manured, and supply a little superphosphate with the seed. Canadian Wonder is one of the best.

Beet (*Red*).—Sow a little seed of the Globe variety to keep up a supply. Sow in drills about 18 inches apart, and cover the seed with fine soil. When they come up, thin plants out to one foot apart.

Beet (*Silver*).—May be sown the same as red beet, but only the leaves of this plant are used. This plant stands the dry weather well and yields a good number of leaves. The outside leaves are used as required. Plant out any young seedlings ready.

Cabbage.—Put out as many plants as possible, and sow a little seed for a further supply. Plant out in richly-manured land, as they require plenty of food.

Carrots.—Sow a supply of seed in land which has been well manured for the previous crop. Sow in drills about 18 inches apart, and thin out when plants come up. The short-rooted varieties are the best to grow.

Celery.—Sow a little seed to keep up a supply. Plant out forward plants from the seed-bed in well prepared trenches. As the plants grow they should be earthed up to cause them to become white.

Cucumbers and Melons.—In warmer localities where there is no danger from frosts seeds may be sown in the open, but in cooler parts they will have to, be raised under shelter.

Leeks.—Sow a little seed in the cooler parts to keep up a supply, and plant out any seedlings that are available.

Lettuce.—Plant out all seedlings in well-manured beds, and give an occasional application of liquid manure to force them along ; a little more seed may be sown. In warm parts it is advisable to sow in drills and thin out, as they are liable to run to seed.

Onions.—Plant out all the young plants you have available. The land should have been previously well manured and worked up to a fine tilth. Onion beds must be kept free from weeds, or the young plants soon die off. Sow a supply of seed for future use. Large quantities of onions are imported, and they always command a good price.

Parsnip.—Sow a few rows of seed to keep up a supply, and thin out those already up.

Peas.—Sow largely of this vegetable so as to keep up a supply. Sow running varieties in drills 3 to 4 feet apart, and the dwarf kind 18 inches apart, and about 4 inches apart in the rows. The running varieties will require to be staked so as to keep them off the ground.

Potatoes should be planted extensively as soon as danger of frost is over. Particular attention should be paid to the seed, that it is good and free from disease. As soon as the tops are a few inches high they should be sprayed with Bordeaux mixture, in which Paris green has been added at the rate of 1oz. to 10 gallons. It is no us waiting until the crop is attacked before spraying, as it may then be too late. The losses from the attacks of the potato-moth grub are very serious.

Sweet Potatoes.—Prepare a seed-bed by taking off the top four inches of soil, then lay a number of tubers in this space and place the soil back again. In a few weeks' time the tubers will send out a large number of shoots, and these are broken off and planted out in prepared land. The land should be got ready for the shoots, and the best results will be obtained if they are planted on hills. This matter is dealt with in a long article, under the title of "Vegetable-growing," in this issue of the *Journal.*

Tomatoes.—In warm positions young plants should be set out as early as possible. Seed may be sown in boxes for successional plantings.

FARM NOTES FOR AUGUST.

By Percy G. Wicken.

The returns of the number of stock in the State which has been recently published afford valuable information to those interested in stockbreeding, and from them we learn that the number of stock in the State continues to increase in spite of the large demands made on them to supply the population with meat. Sheep-breeding is of the greatest interest to farmers in the S.W. portion of the State, and the increase during the past year in sheep, from 3,120,703 to 3,332,981, shows that the sheep-breeding industry has made considerable progress. Farmers in the S.W. portion of the State are realising more every year that there is money to be made in keeping sheep, and as the land becomes ringbarked or cleared its capacity for carrying stock is considerably increased. Many settlers are turning their attention to growing crops, such as rape, for the purpose of supplementing the natural grasses as feed for sheep. No better plant can be grown for this purpose, and if sown on fallow land as early in the season as possible, the plants will grow rapidly after the first rains and will yield a supply of good succulent fodder by the time lambing takes place and when it is most needed to enable the ewes to have a good supply of milk for the young lambs. If the ewes are not supplied with good feed at this time the lambs do not make the quick growth which is necessary to enable them to mature quickly so as to be put on the market as early as possible and thereby obtain the best price. When sheep are being fed on rape it is a good plan to keep a supply of chaff in the paddock so that they can have a bite of dry feed when they feel inclined. If allowed free access to this chaff they will eat a considerable quantity, and will be found to do better than if fed on rape alone. The best way to supply the chaff is to make a portable self-feeder which will hold about half a ton of chaff; the feeder is placed either on small wheels or skids and can be drawn about the paddock whenever required. The cost is only a few pounds and it will soon pay for itself. Models of several different types of self-feeders may be seen at the offices of the Department of Agriculture in Perth.

The first consignment of dairy cows obtained by the Department from the Eastern States arrived during the past month; they were taken from the ship to the Show Ground at Claremont, and they were soon allotted out among those who applied for them. The majority were of the Ayrshire type and they were a good average lot of dairy cows. A few shipments such as this should soon make a difference in the milk supply in the State. The cows varied in price from £10 to £17, and buyers therefore had the opportunity of selecting animals according to the price they were prepared to pay. Although the s.s. "Hobart" had a rough passage, no animals were lost on the voyage across. Further consignments are being obtained from time to time, and each lot will be disposed of on arrival until the demand has been supplied.

As soon as the weather becomes finer, all burning off of timber which it is intended to have done this season should be put in hand at once. The Bush Fires Act restricts the burning off of timber to about six months in the year owing to the danger of fire. The natural conditions of the rainfall cut another three months out of the period allowed by the Act as it is not profitable to burn off during the very wet weather, and this leaves only from three to four months in which burning off can be carried out, and it is necessary to make the most of this time. If the settler has any slack time on his hands he can turn it to profitable use by repairing his fences, doing odd jobs about his buildings, etc., and if he attends to all these matters he will find that even when it is too wet to work on the land his time will be fully occupied.

In the Eastern districts potatoes and many fodder plants may be sown during this month if the season is favourable, but further South it is better to delay until next month. Last year potatoes to the value of £99,242 were imported into the State; practically £100,000 sent out of the State for potatoes, when we are safe in saying that there is hardly a farm in the country where a few potatoes could not be grown during the spring months, and in the S.W. district there are large areas where crops of potatoes can be produced all the year round. Now that it has been decided to grow potatoes for seed purposes at Hamel, settlers should be able to obtain seed potatoes of selected sorts locally grown, from which much better results are likely to be obtained than from imported seed which often arrives in the State in very bad condition.

Grass seeds should be sown as early in August as the ground becomes sufficiently dry to allow of the seed being properly harrowed in, they should be sown on a finely-prepared surface on which the necessary quantity of manure has been spread a few days previously. Land for sowing grass seeds should be left fallow some time before sowing, and all weed seeds allowed to germinate, and the weeds destroyed before the grass seed is sown ; if this is not done the weed seeds in the ground are likely to germinate before the grass and to choke out the young grass as soon as it comes up. As a general rule it is better to sow grass in the autumn, especially in the Eastern district, as it is then enabled to get a root hold during the winter, but where this cannot be done it should be sown as soon as the worst of the wet weather is over. As the result of numerous experiments the African Wonder grass has proved the best of all the grasses yet introduced into this State; it has succeeded in almost every place where it has been tried, both in dry and moist situations, and the introduction of this grass for the stock breeders of this State is worth several times over all the money that has been spent for grass seeds and experimenting with grasses during the last few years. Unfortunately it will not seed in this State, but it makes such rapid growth that a large quantity of cuttings may be obtained in a short time from a single plant; the best way to propagate it is to obtain a few cuttings and plant them out in a well prepared piece of land, this will then form a nursery from which cuttings may be obtained for planting out a larger area when required. A very good mixture suitable for planting out in S.W. portions of the State would be made up as follow:—Cocksfoot, 10lbs.; Tall Fescue, 10lbs.; Tall Oat Grass, 5lbs.; Paspalum Dilatatum Grass, 5lbs.; Hungarian Forage Grass, 3lbs.; Sheeps' Burnett, 5lbs.; White Clover, 2lbs. Total—40lbs. per acre. Sown either broadcast by hand or by means of the grass seed drill.

Root crops such as mangels and sugar beets can be sown this month, if the ground is deeply cultivated both these crops will stand a considerable amount of dry weather, and will provide a supply of good fodder at the end of the summer when it is badly required. Hungarian Millet is a quick-growing crop which can be sown in the spring, and will give a supply of green fodder in a few weeks. It can be sown as soon as danger from frost is over. It is sown and cultivated in the same manner as wheat, and if cut before it becomes too ripe makes excellent chaff for feeding sheep. Jerusalem artichokes are a crop well worth the attention of all farmers; when once growing they are hardy and will stand plenty of dry weather: the tubers are of high feeding value, and pigs will do well on them. The method of planting and subsequent treatment is very similar to that for potatoes. The Jerusalem artichoke belongs to the same tribe as the sunflower, and the tops grow several feet in height and have flowers similar to the common sunflower plant. The tubers ripen towards the end of summer, and are valuable for the table as well as for stock feed purposes.

Most of the spring sowing should be done early in September, and every opportunity of getting the land in good order for sowing summer crops next month should be taken as occasion offers. It is useless working the land when it is too wet, but as soon as the land becomes dry enough for working it should be got into good tilth, ready for planting the seeds later on.

NOTES ON THE CLIMATE FOR THE MONTH OF JUNE, 1907.

The weather was on the whole of a normal character, highs and lows alternating as usual, with their characteristic changes. There were no long continued periods of very fine or very wet weather. The only disturbance which is worthy of record is the one which reached Shark's Bay on the night of the 20th. Just prior to this an ordinary winter storm had passed rapidly along the South coast, and the weather had cleared, and pressure risen very suddenly. After 3 p.m. of the 20th the barometer in the Shark's Bay district took a sudden turn and commenced to fall rapidly, and at 8 a.m. on the 21st very heavy rain was recorded, the maximum being 405 points at Carnarvon, whilst the weather was unsettled and overcast throughout the State South of the Tropics, and raining throughout the Murchison, and also at places in the South-West. The "low" appears to have passed overland, in a S.E. direction, towards the Bight, causing light to moderate rains over the Murchison and Coolgardie fields. On the 27th another disturbance approached the N.W. coast and passed overland, again giving light to moderate rains on the goldfields.

On the whole the barometer and temperature were about normal. The rainfall was heavier than usual on and near the West coast, south of the Tropics, and lighter than usual on the goldfields, but elsewhere about normal.

There were heavy dews and occasional hoar-frost inland during the prevalence of highs, the lowest terrestrial reading being 24.8 deg. at Southern Cross.

The folowing table shows the mean daily and absolute lowest temperatures recorded by a minimum thermometer on the surface of the ground :—

Station.	Mean.	Lowest	Date.	Station.	Mean.	Lowest.	Date.
Peak Hill ...	42·7	33·0	1	Perth Observatory	45·6	35·9	30
Cue	40·5	27·0	1	Wandering ...	36·0	26·5	28
Coolgardie ...	39·8	29·0	15	Bridgetown ..	39·6	31·0	30
Southern Cross ...	38·6	24·8	15	Karridale ...	42·5	29·0	21
Walebing ...	36·7	28·2	17	Katanning ...	40·2	28·6	23
York ...	41·8	34·5	17	Mt. Barker ...	38·5	29·8	30

W. E. COOKE,
Government Astronomer.

The Observatory,
Perth, 10th July, 1907.

The Climate of Western Australia during June, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						June, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
North-West and North Coast:	Wyndham	29·985	30·009	30·209	29·752	84 8	69·8	76 9	91·4	56·0	87·1	67·8	97·5	54·0	*Nil*	...	1,370
	Derby	29·996	30 010	30·262	29·809	82 0	59·4	70·7	90·2	45·0	85·9	60·4	96·0	45·2	171	2	2,338
	Broome	30·064	30 016	30·189	29·817	81·1	59·8	70·4	88·0	43 8	82·7	60·4	96·9	43·4	134	4	2,311
	Condon	30·026	30·032	30·237	29 802	76 8	53·6	65·2	83·2	44·5	78·2	53·8	88·5	38·8	99	4	898
	Cossack	30·011	30·061	30·170	29·810	76·0	57·0	66·5	83·0	49·0	77·0	57·4	91·7	44·9	98	2	997
	Onslow	30·014	30·050	30·174	29·827	77·1	58·5	67·8	84·0	46·4	77·2	54·9	87·0	38·5	206	3	776
	Winning Pool	30·016	...	30·202	29·793	75·2	51·1	63·2	83·8	41·2	...	...	...	...	76	4	969
	Carnarvon	30·052	30·083	30·238	29·818	71 9	52·6	62·2	83·0	45·0	73·2	52·7	85·4	38·2	562	6	826
	Hamelin Pool	30·048	30·086	30·214	29·778	70·0	50·2	60·1	79·0	41·8	69·9	51·4	79·8	33·2	394	5	522
	Geraldton	30·060	30·092	30·290	29·690	70·1	53·1	61·6	78·9	45·7	69 5	52·7	79·8	34·7	632	11	1,118
Inland:	Hall's Creek	30·061	30 082	30·290	29·816	76·1	54 3	65·2	85·0	37·8	80·0	50·8	95·0	33·1	206	5	1,747
	Marble Bar	...	...	...	...	79 0	54·7	66·8	86·2	43·0	79·9	53·4	92·0	40·5	41	2	845
	Nullagine	30 061	30·098	30·302	29·787	74·9	46·6	60·8	83·0	30·2	75·2	48·3	89·8	31·9	50	2	629
	Peak Hill	30 106	30·126	30·342	29·771	66·3	46·5	56 4	74·6	39·8	66·5	47·3	79·2	36·8	159	11	648
	Wiluna	30·102	30·144	30·349	29·715	64·2	42·7	53·4	69·5	31·0	66·3	43·2	79·2	29·3	107	11	516
	Cue	30·100	30·128	30·342	29 734	65·8	45·3	55·6	76·8	31·2	66·0	46·6	82·5	34·0	125	7	570
	Murgoo	...	...	...	...	66·7	45·6	56·2	79·6	39·5	...	...	...	...	211	5	572
	Yalgoo	30·084	30 122	30·444	29·699	64·3	44·9	54·6	75·7	38·1	65·4	46·0	80·9	32·6	115	7	478
	Nunngarra	30·123	...	30·403	29 700	62·1	44·1	53·1	72·0	31·0	...	...	...	...	160	9	571
	Lawlers	30·145	30·139	30·430	29 720	65·0	43·0	54·0	74·0	34·0	63·8	44·9	78·4	33·2	88	9	532
	Laverton	30·132	30·178	30·404	29 660	63·5	43·5	53·5	73·0	32·7	64·3	43·2	79·1	29·4	55	7	687
	Menzies	...	30·125	...	...	62·7	44·1	53·4	70·1	32·0	62·3	44·7	77·6	33·3	52	6	329
	Kanowna	...	...	...	...	61·8	43·5	52·6	70·0	35·0	62·5	43·2	76·1	30·7	28	7	667
	Kalgoorlie	30·125	30·118	30·454	29·625	62·7	45·4	54·1	72 0	34·4	62·0	45·6	76·8	34·0	61	5	622
	Coolgardie	30·131	30·120	30·472	29·604	60 9	44·1	52·5	70·6	34·2	61·5	44·2	78·3	31·5	85	13	851
	Southern Cross	30·118	30 096	30·402	29·593	63·2	42·4	52·8	73·0	29·8	62·5	42·2	77·4	28·0	86	12	410
	Kellerberrin	...	...	...	...	...	...	...	...	...	...	...	...	...	228	10	546
	Walebing	...	...	...	...	63·2	42·2	52·7	72·0	35·0	62·7	42·6	75·7	29·4	496	14	1,074
	Northam	...	...	...	...	63·2	44·4	53·8	71·5	38·0	63·6	41·4	73·8	29·6	381	13	906
	York	30·078	30·094	30·383	29·595	63·1	44·8	54 0	71·0	37·0	63·2	43·0	76·0	30·0	389	13	866
	Guildford	...	...	...	...	64·6	46·4	55·5	73·4	40·0	64·7	44·8	74·7	30·2	872	15	1,520

The Climate of Western Australia during June, 1907—*continued*.

Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
					June, 1907.					Average for previous Years.						
	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
South-West and South Coast:																
Perth Gardens	30·064	30·092	30·365	29·558	64·2	49·6	56·9	72.0	42·6	64·3	47·9	81·0	35·0	796	17	1,519
Perth Observatory ...	30·081	30·081	30·372	29·550	64·5	50·1	57·3	73·5	42·9	63·7	49·3	73·2	36·9	878	16	1,608
Fremantle	30·100	30·078	30·380	29·588	64·9	52·9	58·9	72·0	44·8	64·2	52·3	72·6	30·0	780	15	1,329
Rottnest	30·061	30·062	30·360	29·533	64·0	55·2	59·6	70·5	48·8	63·5	54·7	71·0	42·4	587	17	1,135
Mandurah	...	...	...	...	64·3	48·1	56·2	71·4	36·0	64·3	46·5	73·2	33·4	1126	12	1,335
Marradong	...	...	...	...	...	...	...	...	...	...	...	...	...	390	10	1,025
Wandering	...	...	...	...	60·7	41·6	51·2	68·6	31·8	61·2	38·9	70·0	28·5	405	12	934
Narrogin	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Collie	...	...	...	...	61·7	40·1	50·9	68·8	31·0	60·7	37·8	68·9	27·6	447	15	1,156
Donnybrook	...	...	...	...	62·8	43·5	53·2	70·0	30·0	62·5	42·5	71·3	31·0	503	13	1,415
Bunbury	30·030	30·060	30·370	29·490	64·2	48·8	56·5	68·8	38·9	64·0	48·6	73·7	35·2	559	14	1,239
Busselton	...	...	...	...	63·2	46·4	54·8	69·8	36·2	62·6	45·7	68·3	31·0	518	16	1,073
Cape Naturaliste ...	30·047	30·040	30·366	29·478	61·9	52·4	57·2	69·0	44·0	61·9	53·0	68·9	41·4	653	18	1,474
Bridgetown	...	...	...	...	62·9	41·7	52·3	69.0	32·9	61·4	40·2	69·4	26·6	407	15	1,199
Karridale	30·036	30·031	30·371	29·473	64·3	47·5	55·9	70·3	35·0	62·6	48·0	76·0	31·3	942	21	2,073
Cape Leeuwin	30·004	29·995	30·368	29·436	63·2	54·8	59·0	70·0	49·5	66·0	56·3	78·8	44·9	948	24	2,060
Katanning	30·085	30·062	30·420	29·489	60.3	44·5	52·4	66·2	37·1	59·2	42·4	71·5	29·5	178	10	786
Mt. Barker	...	...	...	...	59·4	44·0	51·7	67·0	33·0	...	...	...	...	268	19	1,031
Albany	30·028	30·010	30·388	29·437	63·8	48·7	56·2	71·6	40·6	61·5	46·4	73·5	35·4	470	23	1,442
Breaksea...	30·014	30·020	30·393	29·422	61·3	51·6	56·4	70·5	44·8	60·3	51·0	72·4	39·6	671	20	1,662
Esperance	30·080	30·058	30·420	29·370	65·0	46·0	55·5	72·0	35·0	63·6	47·9	76·9	35·3	446	15	1,145
Balladonia	30·124	30·152	30·475	29·638	61·8	42·3	52·0	70·0	33·2	62·2	43·5	75·0	29·8	61	9	588
Eyre	30·086	30·104	30·344	29·563	64·4	44·0	54·2	73·3	34·8	65·1	46·2	80·3	29·0	118	5	691
INTERSTATE.																
Perth	30·081	30·081	30·372	29·550	64·5	50·1	57·3	73·5	42·9	63·7	49·3	73·2	36·9	878	16	1,608
Adelaide	30·175	30·124	30·540	29·420	58·9	45·5	52·2	65·0	34·3	60·3	46·9	76·0	32·5	234	11	975
Melbourne	30·198	29·995	30·633	29·633	56·0	40·7	48·4	72·2	30·2	56·9	43·9	68·1	28·0	117	12	865
Sydney	30·050	30·036	30·180	29·720	59·0	49·0	54·0	64·0	43·0	60·4	48·2	74·7	38·1	900	21	2,600

The Observatory, Perth, 10th July, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for May, 1907 (completed as far as possible), and for June, 1907 (principally from Telegraphic Reports).

STATIONS.	MAY, 1907.		JUNE, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham ...	2	1	1	1
6-Mile	...	...	...	...
Carlton	48	1	18	3
Ivanhoe	...	...	...	...
Argyle Downs ...	42	2	...	...
Rosewood Downs	...	...	...	...
Lisadell	...	...	...	...
Turkey Creek ...	1	1	93	7
Ord River ...	...	...	...	...
Alice Downs ...	...	...	...	...
Flora Valley ...	...	...	...	...
Hall's Creek ...	Nil	...	206	5
Nicholson Plains	...	...	...	...
Ruby Plains ...	...	...	...	...
Denison Downs	...	...	...	...
WEST KIMBERLEY:				
Mt. Barnett ...	...	...	...	...
Mt. House ...	...	...	...	...
Leopold Downs...	Nil	...	...	...
Fitzroy Crossing (P.O.)	Nil	...	209	6
Fitzroy Station...	...	...	...	...
Brooking ...	...	...	...	...
Cherrabun ...	Nil	...	...	...
Bohemia Downs	...	...	...	...
Quanbun ...	...	...	...	...
Nookanbah ...	...	...	..	...
Upper Liveringa	43	1	...	...
Yeeda	96	1	...	...
Derby	Nil	...	171	2
Pt. Torment ...	1	1	...	...
Obagama ...	Nil	...	...	...
Beagle Bay ...	...	...	...	...
Roebuck Downs	...	...	...	...
Kimberley Downs	...	...	...	...
Broome	Nil	...	134	4
La Grange Bay...	Nil	...	128	4
N.W. COAST:				
Wallal	Nil	...	51	2
Pardoo	...	...	...	...
Condon	Nil	...	99	4
DeGrey River ...	Nil	...	...	...
Port Hedland ...	Nil	...	65	5
Boodarie ...	Nil	...	...	...
N.W. COAST—*contd.*				
Whim Creek ...	Nil	...	41	2
Mallina	Nil	...	...	...
Croydon	Nil	...	...	...
Sherlock... ...	...	...	...	...
Woodbrooke ...	...	...	...	...
Cooyapooya ...	Nil	...	...	...
Roebourne ...	Nil	...	63	2
Cossack	Nil	...	98	2
Fortescue ...	Nil	...	93	5
Mardie	...	...	..	...
Chinginarra ...	...	...	...	...
Yarraloola ..	...	...	..	...
Peedamullah ...	Nil	...	...	...
Onslow	20	1	208	4
Point Cloates ...	...	...	...	...
N.W. INLAND:				
Ethel Creek ...	Nil	...	...	...
Warrawagine ...	...	...	...	...
Eel Creek ...	...	...	...	...
Muccan	...	...	...	...
Ettrick	Nil	...	..	...
Strelly	...	...	...	...
Mulgie	...	...	...	...
Warralong ...	...	...	...	...
Coongon ...	Nil	...		...
Talga	...	...	...	...
Bamboo Creek ...	Nil	...	123	4
Moolyella ...	...	...	...	...
Marble Bar ...	Nil	...	41	2
Warrawoona ...	Nil	...	110	1
Corunna Downs	...	...	...	...
Mt. Edgar ...	Nil	...	...	...
Nullagine ...	Nil	...	54	3
Bonny Station ...	Nil	...	..	...
Middle Creek ...	Nil	...	...	...
Mosquito Creek	...	...	...	...
Roy Hill ...	Nil	...	...	...
Bamboo Springs	Nil	...	...	...
Kerdiadary ...	Nil	...	...	...
Woodstock ...	Nil	...	..	...
Yandyarra ...	Nil	...	...	...
Station Peak ...	Nil	...	...	...
Mulga Downs ...	Nil	...	...	...
Mt. Florence ...	Nil	...	...	...
Tambrey ...	Nil	...	...	...
Millstream ...	Nil	...	...	...

RAINFALL—*continued.*

Stations.	May, 1907.		June, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. Inland—*contd.*				
Red Hill ...	Nil	...	...	...
Mt. Stewart ...	Nil	...	...	...
Coorara	Nil	...	...	...
Peake Station ...	4	1	...	...
Nanutarra ...	...	...	...	...
Towera	7	2	...	...
Gascoyne:				
Winning Pool ...	15	2	76	4
Coordalia ...	...	...	...	...
Wandagee ...	...	...	...	...
Williambury ...	7	1	...	...
Yanyeareddy ...	...	...	...	...
Maroonah ...	...	...	...	...
Ullawarra ...	Nil	...	...	...
Mt. Mortimer ...	...	...	...	...
Edmunds ...	18	2	...	...
Gifford Creek ...	Nil	...	...	...
Bangemall ...	Nil	...	...	...
Upper Clifton Downs	18	1	...	...
Clifton Downs ...	11	1	. .	..
Mearerbundie ...	29	2	..	...
Byro	49	3	...	...
Meedo	25	1	..	...
Minnie Creek ...	73	2	...	...
Bintholya ..	...	.	...	.
Lyon's River ..	17	1	...	...
Mangaroon ...	...	..	...	...
Booloogooroo ...	3	1	. .	...
Junction Station	5	1	...	...
Doorawarrah ...	Nil	...	.	...
Brick House ..	...	.	.	.
Boolathana ...	32	4	...	. .
Carnarvon ...	47	4	562	6
Point Charles ...	22	4	.	
Dirk Hartog ...	..	..	...	...
Sharks Bay ...	37	3	619	7
Wooramel ...	65	4	367	5
Hamelin Pool ...	68	4	394	5
Kararang ...	225	7	...	...
Tamala ...	179	...	.	...
Yalgoo District:				
Woolgorong ...	58	3	...	...
New Forest ...	47	2	...	...
Yuin	50	8	...	...
Yalgoo District—*contd.*				
Pindathuna ...	...	...	...	...
Tallyrang ...	68	3	...	...
Mullewa ...	92	4	295	8
Kockatea ...	124	5	286	9
Barnong ...	86	4	237	10
Gullewa	...	...	190	7
Gullewa House...	65	5	211	13
Gabyon	36	3	157	7
Mellenbye ...	41	4	...	...
Wearagaminda...	64	4	164	10
Yalgoo	54	8	115	7
Wagga Wagga ...	84	8	101	5
Muralgarra ...	50	2	...	...
Golden Grove ...	40	4	191	10
Burnerbinmah ...	36	7	167	11
Nalbara	54	2	...	...
Wydgee	...	...	135	8
Field's Find ...	49	5	134	10
Thundelarra ...	44	4	168	10
Rothesay ...	...	...	...	...
Ninghan ...	104	6	...	...
Condingnow ...	...	...	...	...
163-Mile ...	...	...	..	...
126-Mile ...	...	...	...	...
90-Mile	60	...	143	5
Mt. Jackson ...	74	4	149	7
Murchison:				
Wale	65	3	...	...
Yallalonga ...	...	...	...	..
Billabalong ...	45	3	..	...
Twin Peaks ...	...	...	...	...
Murgoo	51	2	211	5
Mt. Wittenoom ..	36	2	...	...
Meka	33	2	253	6
Wooleane ...	40	1	...	...
Boolardy ...	...	...	...	...
Yederadda ...	22	2	...	...
Woogorong ...	44	2	203	4
Manfred ...	28	3	...	...
Yarra Yarra ...	61	2	...	...
Milly Milly ...	38	2	...	...
Berringarra ...	23	1	...	...
Mileura	31	2	...	...
Mt. Gould ...	30	1	...	...
Moorarie ...	43	2	...	...
Peak Hill ...	39	2	159	11
Minderoo ...	...	...	...	...
Abbotts	40	2	137	6
Belele	84	2	160	7

RAINFALL—*continued.*

Stations.	May, 1907.		June, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Murchison—*contd.*				
Gabanintha ...	27	3	159	9
Bungalow ...	33	2	29	3
Quinns	...	...	135	6
Nannine	27	2	166	9
Annean	24	2	174	7
Tuckanarra ...	53	3	200	5
Coodardy ...	5	1	153	6
Austin Downs ...	13	2	125	6
Cue	6	2	125	7
Day Dawn ...	13	2	126	8
Lake Austin ...	13	2	112	6
Lennonville ...	26	2	143	12
Mt. Magnet ...	37	3	111	7
Youeragabbie ...	39	2	115	5
Murrum	85	3	...	...
Challa	19	2	118	4
Nunngarra ...	46	3	169	9
Berrigrin ...	24	2	...	...
East Murchison:				
Gum Creek ...	65	1	98	4
Wiluna	48	1	107	7
Mt. Sir Samuel ...	37	2	81	4
Leinster ...	39	3	...	...
Lawlers	70	2	88	9
Wilson's Patch ...	71	2	80	3
Poison Creek ...	...	...	47	4
Lake Darlôt ...	43	2	20	5
Darda	27	2	...	...
Salt Soak ...	71	4	...	...
Erlistoun ...	89	2	..	...
Mulga Queen ...	85	4	39	5
North Coolgardie Goldfields:				
Laverton ...	63	2	55	7
Mt. Morgans ...	57	2	39	9
Murrin Murrin ...	68	2	20	4
Mt. Malcolm ...	89	2	32	2
Mt. Leonora ...	68	2	47	6
Tampa	69	2	...	...
Kookynie ...	64	2	34	8
Niagara	45	2	37	6
Yerilla	79	3	...	...
Yundamindera ..	67	2	38	7
Mt. Celia ...	60	2	...	...
Quandinnie ...	85	4	...	..
Menzies	25	2	52	8
Mulline	103	4	92	8
Mulwarrie ...	107	3	71	8
Goongarrie ...	106	3	47	8
Coolgardie Goldfields:				
Waverley ...	85	2	...	...
Bardoc	141	4	26	3
Broad Arrow ...	129	5	44	8
Kanowna ...	163	4	28	7
Kurnalpi ...	138	3	41	4
Bulong	144	4	50	3
Kalgoorlie ...	131	4	61	5
Coolgardie ...	128	8	85	13
Burbanks ...	96	5	51	6
Bulla Bulling ...	120	5	...	...
Woolubar ...	63	2	50	1
Waterdale ...	107	6	81	7
Widgiemooltha ...	75	8	77	12
15-Mile Condenser	58	5	67	4
50-Mile	35	...	...	...
Norseman ...	76	8	94	7
Lake View ...	63	5	...	...
Frazer Range ...	81	2	...	...
Southern Hills ...	116	5	...	...
Yilgarn Goldfields:				
129-Mile	...		...	..
Emu Rocks ...	89	6		...
56-Mile	73	...	163	6
Glenelg Rocks ...	116	5		...
Burracoppin ...	114	5	164	4
Bodallin ...	69	2	58	2
Parker's Road ...	...	.	.	..
Southern Cross ...	62	5	86	12
Parker's Range ...	...			...
Yellowdine ...	74	4	78	5
Karalee	80	3	64	4
Koorarawalyee ..	82	6	94	8
Boorabbin ...	67	5	47	6
Boondi	62	6	51	9
South-West (Northern Division):				
Murchison House	131	7	458	7
Mt. View ...	71	8	279	10
Mumby	140	9	404	10
Willow Gully ...	311	12	515	9
Northampton ...	208	6	445	6
Chapman Experimental Farm	231	9	301	9
Narratarra ...	376	10	...	..

RAINFALL—*continued.*

Stations.	May, 1907.		June, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
South-West (Northern Division)—*contd.*				
Oakabella	333	10	394	9
White Peak	298	11	444	11
Geraldton	349	12	632	11
Hinton Farm	...	...	557	...
Tibradden	413	6	...	...
Myaree	237	11	...	...
Sand Springs	163	3	381	8
Nangetty	149	7	400	11
Greenough	310	9	540	7
Bokara	358	11	549	13
Dongara	315	11	526	11
Strawberry	331	9	571	10
Yaragadee	116	5	...	...
Urella	163	7	460	10
Opawa	151	9	425	12
Manara	166	10	402	10
Mingenew	234	10	442	10
Yandenooka	210	8	447	9
Arrino	254	5	359	5
Three Springs	237	10	383	18
Carnamah	292	9	358	9
Hill River	...	...	886	13
Jun Jun	190	7	210	6
Watheroo	278	9	399	12
Nergaminon	264	8	449	11
Dandaragan	401	9	518	11
Yatheroo	478	8	...	...
Moora	252	8	427	11
Walebing	302	9	498	14
Round Hill	243	9	422	13
New Norcia	319	10	548	16
Wongon Hills	226	8	302	13
Wannamel	400	9	761	12
Gingin	566	9	850	12
South-West (Metropolitan):				
Wanneroo	506	10	815	13
Belvoir	516	9	837	12
Wandu	499	11	842	16
Mundaring	716	10	1028	15
Canning Waterworks	593	12	786	15
Kalbyamba	432	10	...	...
Guildford	402	11	872	15
Perth Gardens	524	11	796	17
Perth Observatory	518	11	878	16
Highgate Hill	542	11	931	14
Subiaco	477	11	895	15
South-West (Metropolitan)—*cont.*				
Fremantle	390	12	780	15
Rottnest	401	12	587	17
Rockingham	636	12	714	13
Jandakot	681	8	712	13
Armadale	450	13	475	16
Jarrahdale	722	12	769	15
Jarrahdale (Norie)	...	...	...	...
Serpentine	600	12	717	13
Extreme South-West:				
Mandurah	561	13	1126	12
Pinjarra (Blythewood)	433	10	756	14
Pinjarra	562	10	806	12
Upper Murray	683	12	...	...
Yarloop	686	13	...	...
Harvey	563	13	766	14
Harvey Downs	827	13	...	...
Brunswick	672	11	764	11
Collie	487	14	447	15
Glen Mervyn	506	9	...	...
Donnybrook	594	14	503	18
Boyanup	...	...	...	...
Bunbury	470	14	559	14
Elgin	484	14	485	16
Busselton	371	13	518	16
Quindalup	619	15	802	19
Cape Naturaliste	504	15	653	18
Glen Lossie	570	16	1000	20
Karridale	743	19	942	21
Cape Leeuwin	697	20	948	24
Lower Blackwood	565	9	569	15
Ferndale	544	13	473	15
Greenbushes	591	12	383	11
Cooeearup	596	16	371	18
Bridgetown	505	13	407	15
Hilton	452	9	266	6
Greenfields	407	9	333	15
Dunninup	406	9	...	...
Cundinup	359	8	...	...
Wilgarrup	552	13	452	18
Balbarrup	554	10	469	11
Bidellia	408	8	590	14
Westbourne	467	13	254	12
Deeside	476	9	418	18
Riverside	477	12	...	...
Mordalup	366	8	...	...
Lake Muir	...	...	...	...

RAINFALL—*continued.*

Stations.	May, 1907. No. of points. 100 = 1in.	May, 1907. No. of wet days.	June, 1907. No. of points. 100 = 1in.	June, 1907. No. of wet days.
Eastern Agricultural Districts:				
Walgo	278	10	410	10
Dowerin ...	151	6	288	11
Cow-cowing ...	107	5	...	...
Uberin	205	7	305	12
Hatherley ...	198	7	...	...
Momberkine ...	201	4	414	9
Bolgart	...	...	...	...
Eumalga ...	451	11	648	16
Newcastle ...	324	11	521	12
Craiglands ...	563	10	793	10
Eadine	381	11	614	15
Chidlow's Well ...	...	...	796	14
Baker's Hill ...	291	7	513	8
Berry Brow ...	334	7	542	13
Northam ...	291	8	381	13
Grass Valley ...	231	5	332	10
Cobham	290	9	383	14
York	294	10	389	13
Burrayocking ...	287	7	316	13
Meckering ...	195	8	269	9
Cunderdin ...	196	7	246	10
Doongin	172	7	168	7
Whitehaven ...	240	6		...
Mt. Caroline ...	203	8	209	9
Qualing	. .	..	...	...
Cutenning ...	154	7	..	...
Kellerberrin ...	155	5	223	10
Cardonia ...	155	6	196	12
Baandee ...	127	6	174	5
Nangeenan ...	129	5	159	8
Merredin ...	115	5	166	9
Codg-Codgen ...	116	6	234	12
Mangowine ...	123	8	175	9
Yarragin ...	124	5	...	...
Wattoning ...	. .	..	..	.
Koomberkyne ...	206	9	242	14
Great Southern Railway Line:				
Dalebridge ...	268	6	455	13
Beverley ...	394	7	520	12
Brookton ...	327	7	.	
Sunning Hill ...	329	10	348	15
Pingelly ...	283	11	262	14
Yornaning ...	281	11	214	12
Narrogin ...	290	9	247	8
Narrogin State Farm	290	8	231	5
Rose Hill ...	216	7	...	...
Wagin	260	9	227	11

Stations.	May, 1907. No. of points. 100 = 1in.	May, 1907. No of wet days.	June, 1907. No. of points. 100 = 1in.	June, 1907. No. of wet days.
Great Southern Railway Line—*contd.*				
Katanning ...	348	10	178	10
Sunnyside ...	289	7	254	13
Broomehill ...	350	9	246	12
Woodyarrup ...	323	10	187	11
Pallinup ...	198	7	139	4
Tambellup ...	286	9	183	10
Toolbrunup ...	270	9	154	11
Cranbrook ...	346	12	222	17
Stirling View ...	306	12	198	16
Kendenup ...	311	12	308	20
Woogenellup ...	254	12	...	...
Woodburn ...	...	...	...	...
St. Werburgh's...	320	15	...	...
Mt. Barker ...	310	13	268	19
West of Great Southern Railway Line:				
Talbot House ...	306	8	395	12
Jelcobine ...	347	10	355	9
Bannister ...	428	11	...	...
Wandering ...	296	11	405	12
Glen Ern ...	323	11	398	13
Marradong ...	439	10	390	10
Wonnaminta ...	352	11	298	13
Williams ...	244	10	251	11
Rifle Downs ...	461	7	...	...
Darkan	299	6	.	...
Arthur River ...	320	8	293	11
Gainsborough ...	198	9	235	8
Glenorchy ...	326	6	261	9
Kojonup ...	466	9	293	6
Northumberland Homestead	295	10	238	16
Blackwattle ...	404	12	277	11
Warriup ...	380	13	267	16
Forest Hill ...	338	14	269	19
East of Great Southern Railway Line:				
Sunset Hills ...	280	7	314	10
Oakdale	286	7	383	9
Barrington ...	278	8	348	9
Bally Bally ...	318	10	306	13
Stock Hill ...	335	6	338	5
Qualin	363	8	285	8
Woodgreen ...	235	7	191	10
Peakaring ...	317	6	...	...
Glenallan ...	333	9	...	...
Gillimanning ...	274	9	...	...

RAINFALL—*continued.*

Stations.	May, 1907.		June, 1907.	
	No. of Points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
East of Great Southern Railway Line—*contd.*				
Wickepin ...	321	8	...	...
Crooked Pool ...	...	...	179	5
Nallyring ...	223	8	278	14
Yardup ...	264	10	117	14
Bunking ...	186	6	219	7
Bullock Hills ...	217	7	...	...
Dyliabing ...	253	11	...	...
Glencove ...	288	10	264	14
Cherillalup ...	233	7	...	...
Strathavon ...	241	10	127	18
Warperup ...	295	10	..	...
Woolganup ...	335	10	116	7
Chillinup ...	251	7	...	.
Jarramongup ...	231	10	...	...
South Coast:				
Wilson's Inlet ...	483	17	460	21
Grasmere ...	525	14	570	20
King River ...	440	11	306	18
Albany	549	15	470	23
Point King ...	509	13	477	16
Breaksea ...	502	18	671	20
Cape Riche ...	393	10	350	8
South Coast—*contd.*				
Peppermint Grove	479	9	454	15
Bremer Bay ...	550	8	382	11
Cocoonarup ...	187	7	...	...
Ravensthorpe ...	172	10	153	11
Cowjanup ...	...	...	...	...
Hopetoun ...	339	6	182	6
Fanny's Cove ...	315	7	461	11
Park Farm ...	418	11	...	...
Grass Patch ...	...	...	184	7
Swan Lagoon ...	128	5	...	..
30-Mile	188	7	..	...
Gibson's Soak ...	273	8	290	11
Myrup	292	7	455	11
Esperance ...	286	10	446	15
Boyatup	249	8	...	...
Lynburn ...	216	11	..	...
Cape Arid ...	..	...		
Point Malcolm ...	171	11		...
Israelite Bay ...	88	8	132	11
Nannambinia ...	76	4	.	...
Balbinia	.	...		..
Balladonia ...	72	3	61	9
Eyre	164	5	118	5
Mundrabella ...		...	..	...
Eucla	51	4	78	10

The Observatory, Perth,
12th June, 1907.

W. E. COOKE,
Government Astronomer.

By Authority: Fred. Wm. Simpson, Government Printer, Perth.

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NOTES.

Cabbage Aphis.—It is always pleasing to hear that the work of the Agricultural Department is appreciated. The following letter from Mr. Maywood, of Fremantle, is to the point. He states :—"I am pleased to be able to report that the parasites for cabbage aphis forwarded by you have so successfully done their work that I am unable to find a live aphis in my garden. The parasites, however, are very much in evidence."

Potato Crop in Victoria.—The average potato yield for the past season in Victoria, says an *Exchange,* has been about three tons to the acre, which is somewhat better than the average for the previous season, while the area under this crop was considerably larger than it was a year before. But ruling prices at the present time are very disappointing as compared with those of a year ago. Wholesale rates now are from 40s. to 50s. per ton. whereas this time last year pink-eyes were worth from £6 10s. to £7 per ton. This unsatisfactory state of the market, so far as the growers are concerned, is largely due to the importations of potatoes from Tasmania, where an exceptionally heavy crop has been gathered.

Agricultural Lectures.—On the 24th inst., Mr. P. Wicken, Field Officer, of the Agricultural Department, paid a visit to Boyanup and delivered a lecture to the members of the local Progress Association on the subject of "Grasses and Fodder Plants." Though the weather was bad the lecture was well attended, those present being very interested in the subject of grasses. The lecture was illustrated by means of lantern slides, and the lecturer pointed out the necessity of giving attention to the cultivation of deep-rooted grasses, as they are able to send their roots down into the sub-soil and obtain moisture during the dry summer months. In addition to grasses such fodder plants as rape, lucerne, clover, cow peas, etc., were also dealt with.

Tanning Skins.—In answer to a correspondent who asks for a formula to be used for the tanning of skins, we give the following, which we nave found to be a very good one :—Pour two quarts of boiling water over one quart of bran, and two quarts of warm water at blood heat, dissolve as much salt as it will take up, between four and five ounces, then mix the saltwater and branwater together, making one gallon, to which add one ounce of sulphuric acid. Soak the skins in this mixture, using an earthenware vessel, well stirring for 20 minutes, then rinse in clean cold water, and hang to dry in a shady place. As they dry, pull the skins well, removing any pieces of fat that may be found ; the skins, when dry, will be perfectly white.

Bone Dust.—During the course of a recent series of lectures on garden cultivation given on the goldfields, the use of bone dust, unless obtained very fine, was deprecated, as it took considerable time before the coarse particles could be dissolved. This is borne out by an incident that happened last month, when a gardener had occasion to dig up a vine that had been planted 20 years ago, and which had received a dressing of coarse crushed half-inch bones at the time of planting. The bones were found to be in the same condition as when first put into the ground, they did not seem to have decayed, nor had the vine roots embraced them in a single instance. Unless the ground contains a fair amount of acid to act upon the coarser particles it is a waste of money to apply it.

Fruit Fly Destruction.—The value of a careful watch being kept on orchard pests has, in a case just reported from Donnybrook, been well rewarded. Mr. G. Wickens, an orchard inspector, reports that Mr. Thos. Walters, orchardist, Donnybrook, has exercised great care in keeping a strict watch for all fruit attacked with the fruit fly, destroying it as soon as found. Mr. Walters left all the crop of a late variety of peach, the "Comets," hanging on the trees for the purpose of attracting the later hatchings of the fruit fly. The fruit, when picked, in every case developed larvæ, which were destroyed. The advantages of so sacrificing the peaches was made evident in the fact that not a single infested pear, apple, or quince has since been found. A quantity of oranges were also growing in the orchard, but not one of them were found to be infected.

Bitter Flavour in Butter.—A correspondent writes asking the remedy for "Bitter Flavour in Butter." The matter being referred to the Dairy Expert, Mr. Kinsella, replied as follows :—It is rarely found that the bitter flavour is caused by the cows eating weeds. Turnip feeding gives a distinct "Turnip" flavour to butter, the same as in the case of feeding onions and rape. A weed well known here and in the other States as "Stinkwort" imparts, what is termed in the trade, a weedy flavour. I think the trouble might arise from keeping several small lots of cream standing too long before churning. "Over-ripe" or stale cream will give a bitter flavouring to butter. The cause is often due to unclean milk or cream utensils. To determine whether weeds are the cause, the cows should be kept off the pasture for, say, two or three churnings, when the result will be decided.

Lompos in Horses.—Lompos is a common disease among the stable horse, says an *Exchange*, and the barbarous practice is that of operating with hot irons on the tender bars of the horse's mouth. This disease affects young horses before they have their full set of teeth. Young horses, changed from green pasture to dry, hard feed in the stable, are much troubled with it. The bars of the roof of the mouth will inflame, and the horses refuse to eat the feed. The treatment should be simple. Merely give soft feed, consisting of bran mashes, to keep the bowels open, soaked or scalded oats, boiled roots, etc., for a few days, and the trouble will generally disappear. It can positively be said that no other remedies need be used. In case of loss of appetite, one teaspoonful to one tablespoonful of rex conditioner sprinkled over each feed. This will restore a vigorous appetite. Avoid burning the horse's mouth. It ruins the delicate sensitiveness to the touch of the reins so necessary in a pleasant, well-broken roadster. It often destroys the palate, and makes the horse a confirmed "wheezer." Burning is inhuman, and lessens the value of the horse, and it is unnecessary.

Controlling the Sex of Calves.—"Scio" writes as follows in the *Live Stock Journal*:—"A young and vigorous bull, as a rule, gets more bull calves than an old one. Last year I had on service a yearling bull, and also a five-year-old. I do not pretend that one herd can give one any reliable criterion, still less thirteen cows ; but during the last three months I have had six calves from the old bull, which were four heifers to two bulls, and five calves from the young bull, which were four bulls to one heifer. Some cows have a decided tendency to breed bulls. One cow of mine out of eight or nine calves has only once thrown a heifer. In a case like this the decided tendency on the part of the cow entirely eclipses any tendency on the part of the bull in the opposite direction. A strong, big-framed, beefy, vigorous cow, with a small milk yield, should have a tendency to breed bulls, while a heavy-milking cow, whose frame is more or less exhausted by a big milk yield, especially if she is served again pretty soon after calving, should have a tendency to breed heifers. I do not mean to say that the 'tendency' implies that every calf will be a heifer, but that the majority of the calves will be heifers. I think the best way to get heifer calves is to have an old slow bull, the slower the better, with plenty of work to do ; whereas if bulls are wanted, young quick bulls should be kept, and care should be taken not to overwork them."

———

Are Steers or Heifers most Profitable?—The question of fattening steers or heifers, and the sale of one or the other, says a writer in the *Pastoralists Review*, are questions that do not crop up so frequently as they might with advantage do. If we take a glance at the fattening of the animals, we find that, as a rule, steers require both a little more time and a little richer pasture, or more cake and corn, than do heifers to fit them to top the fat stock markets. There is, of course, a great deal to be said in this respect about breeding. Where steers are very highly bred they fatten much more readily than do those that are more coarsely bred, or, as we might call them, bred at haphazard. These latter are ofttimes very hard, slow, and unprofitable feeders. Then comes the question of marketing. For generations past ox beef has invariably obtained most favour in the metropolis and for army and navy contracts, whilst for the opposite of this there are many provincial markets, and especially small country villages, where the butchers will scarcely look at a steer, heifers always being much in favour, and realising a higher price per pound. This latter property, together with the quicker and less expensive feeding that the heifers require, would, one would naturally conclude, place them at the top of the page where profits are calculated ; but this is not always so, for the steer attains considerably greater weight, which brings him up quite to the high level of the heifer. The feeder of steers, too, has one great point in his favour, namely, that steers are better resters, and much less liable to accidents than heifers. The latter, when fattening in either pasture or fold yard, every three weeks upset themselves and one or two others of their companions, which is a great drawback at the best of times, and when, as occasionally happens, there is a sprain of the shoulder to be taken into consideration, or some other lameness following, there is great loss. On the whole, where large numbers are being fattened, and the feed is sufficiently good for steers, the writer would pin his faith to that sex for profit. One thing must not be forgotten—that steers and heifers never ought to be fattened in the same pasture together.

A FLY SCARE.

A large consignment consisting of 500 camels was, towards the end of March last, introduced into Western Australia from India.

The animals, it is reported, had been carefully selected in the upper provinces, and were shipped from Kurrachi.

After a voyage extending over three weeks the steamer arrived at Port Hedland, on the North-West coast of this State; and were there duly landed and driven to quarantine, some 50 to 60 miles from the Port.

Half a dozen camels died shortly after landing ; the cause of the death is reported to be due to hoven or bloating in consequence of sudden change of diet from dry to green feed. The rest of the mob has since been resting and are now reported to be fat and in particularly good condition.

A few weeks ago a mild scare was created owing to the fact that some sucking flies had been in evidence some six or seven miles from the spot where these camels are camped, and it was at once assumed by some alarmist that the insect was, if not the "Tsetse" fly itself, at least a closely allied representative.

Since then more specimens of flies have been procured by the Department of Agriculture and handed over to Mr. Newman, the Government Entomologist's assistant. These were carefully examined and found to belong to the *Hippoboscidae*, and in order to throw some light on the appearance as well as on the habits of both the "Tsetse" fly and of this newly reported fly, illustrations have been prepared of each, and some explanatory notes touching upon the life, history, and manner of attack of these troublesome insects are now given for public information.

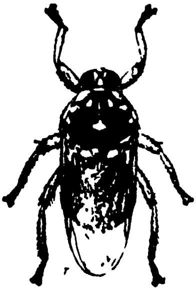
Further inquiry into the circumstances of the case have brought to light the fact that on the 9th January last, or over two months before the camels were landed at Port Hedland, several specimens of these flies were caught at Fremantle on two racing mares brought back from Broome on one of the North-West coast steamers.

These flies have evidently been in Australia, as they have been in a number of other countries for a long time past.

A HORSE FLY.

By L. J. NEWMAN.

Within the last few weeks a few specimens of a stock-biting fly have been sent for identification to the Department from the neighbourhood of Port Hedland. On examination these flies have been seen to belong to the *Hippoboscidae* family. This family is distributed throughout the world, and includes a number of small genera, the species of which are all parasitic on mammals and birds.



Horse Tick Fly (*Hippobosca Sp*), double natural size (× 2). Specimens have been captured on horses landed from Broome in January, 1907.

We will take the genus *Hippobosca*, which is also probably distributed throughout the world, and, with one exception, its 7 known species are parasites on horses, donkeys, camels, cattle, and dogs.

In England these flies are popularly known as "Forest-flies." They are found in woodlands, and are very troublesome to horses and other animals, lighting about the eyes and mouth, or creeping under the tail and piercing the skin with their sharp mouth-pieces. As a rule their presence, even when in numbers, does not seem to incommode the infested animals after they have become used to them ; yet if one alights upon a horse unaccustomed to the presence of the fly he becomes almost crazy with fright, probably from the pinching or tickling sensation produced by their claws.

The general colouration is a yellowish-brown, the thorax mottled with yellow, the body is broad, flat, and horny, with long wings. The wings when resting are closed flat over one another like the blades of a pair of scissors. The legs are powerfully developed, and the claws have a secondary process on the under side to assist the insect in clinging to the hair of the host.

The mode of reproduction is described by Van Beneden, in his book of animal parasites, as a further development of the process seen in the "Tsetse Fly." The larva is retained within the oviduct of the mother until it is full-grown, and is not born until it is ready to change to a pupa. It is an ovoid or globular body.

These insects, as a rule, fly but little, and only for the purpose of moving from one host to another. When using their legs they run sideways like a crab.

This fly usually attacks animals between the thighs, between the anus and the scrotum, and under the tail. This insect has often been mistaken for the " Tsetse " fly, but, on comparison, they are only alike in three points, 1st, they are both greedy blood-sucking insects ; 2nd, the wings in both are folded down the back like a pair of scissor blades ; 3rd, the mode of reproduction is the same, in that the larva on being dropped are full-grown and pupate at once under cover. Apart from these three points of similarity there is a great difference in external appearances, as the illustrations which accompany these notes will show.

THE TSETSE FLY.

Glossina morsitans.

There are no less than seven species of this fly, but the one most commonly known and met with is that of *Glossina morsitans.*

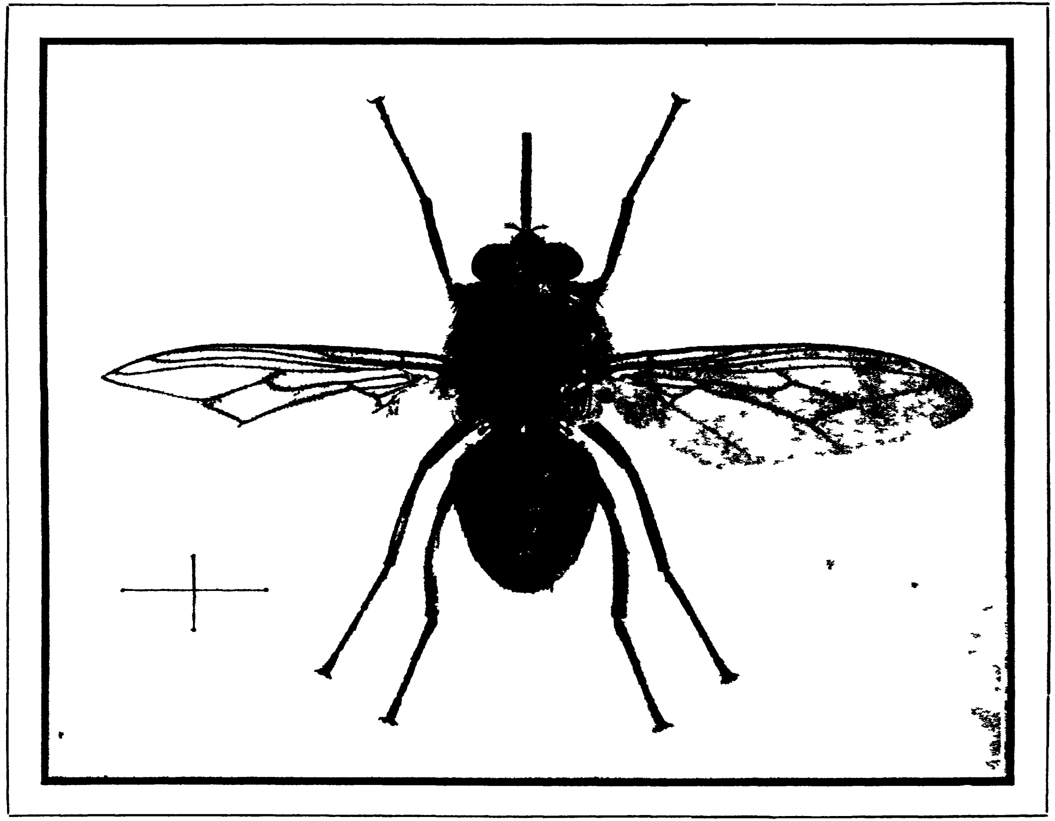
It is described by Austin in his monograph on these flies as an ordinary looking, sombre, brownish-grey fly, the body being about a quarter of an inch long. The hinder half of the body or abdomen is a paler colour, and marked with sharply defined, dark brown bands. The wings, when at rest, lie closed flat over one another down the back, like the blades of a pair of scissors.

The proboscis projects horizontally in front of the head, and there are six legs. Measured from tip of proboscis to end of closed wings is half an inch. The sexes of Tsetse flies can readily be distinguished when examined, since in the male the external generative organs form a conspicuous knob-like protuberance, beneath the end of the abdomen, which is absent in the female.

Apart from the prominent proboscis and the mode of carrying the wings when resting, there is nothing remarkable or striking about the appearance of a Tsetse fly.

Those parts of Africa infested with Tsetse are known as " Fly-belts." They have been recorded between the 13th deg. North latitude, and as far South as the 27th degree of latitude, or within tropical or sub-tropical zones, such as British East Africa, German East Africa, Portuguese East Africa, Rhodesia, Matabele, Northern Transvaal, the banks of Lake Chad, L. Nyassa, L. Tanganijika ; the rivers Zambesi, Chobe, Congo, Limpopo, etc.

All recent evidence goes to show that the most important element is the physical character of the locality. Many people suppose that the Tsetse is



TSETSE FLY (*Glossina morsitans*) x 6
Erroneously reported as having been introduced into Western Australia (*E E Austin*)

regulated by the amount of buffalo about, but it has been proved that the description of country, proximity to water, and a moist hot climate are as great factors as the abundance or scarcity of game.

As a general thing, it may be said, that the Tsetse fly is confined to damp, hot, low-lying localities, either on the borders of rivers, lakes, coast line, or, at any rate, not far from water. Its habitat is sharply defined, cover in the shape of more or less thick bush or forrest is essential, and the fly is never found in open grass country. The native stockmen can ensure comparative safety to their cattle by rounding these particular "Fly-belts," or by passing through them after sundown, provided the night is cool and not moonlight. They also smear their cattle with a mixture of milk and dung as a precautionary measure.

The flight of the Tsetse is rapid and straight, its sight and smell keen, and it attacks by preference on the leeward side. When its abdomen is full of blood its flight is heavy, and it at once hides itself.

The Tsetse owes its name to the peculiar high-pitched buzzing note produced when on the wing.

When a Tsetse settles to feed he inserts his proboscis, lowers his head, and raises his abdomen until it is almost vertical. He will suck until his originally skinny, barred abdomen becomes a large crimson bead. It attacks in the most unprotected parts such as the back, belly, in the region of the fetlock, and even in the nostrils. The time taken by the Tsetse in sucking its fill is extremely short, about 20 to 30 seconds.

The reproduction of this fly is exceptional. It does not lay eggs, as do the majority of the *Diptera,* but extrudes a yellow-coloured larvæ, nearly as large as the abdomen of the mother. Immediately on being born, the larvæ creeps about with a good deal of activity, for some cover or hole to hide in. Having found a resting place it immediately begins to change colour, and, after a few hours, has changed into a jet-black, hard pupa, from which the perfect insect emerges, in about six to eight weeks.

This fly of itself is not harmful, as is commonly supposed, being nothing more than a blood sucking insect, acting, however, as a carrier of a living germ, an infinitely small parasite, which is present in some species of animals living in the fly-country, from one animal to another which, on entering into the blood of the animal, bitten or pricked, there propagates, and so gives rise to the disease. The proboscis acts in the same way as the vaccinating needle carries the vaccinia from child to child, when being vaccinated.

The Tsetse Fly disease is known in Africa as "Nangana," a Zulu word meaning "to be low or depressed in spirits."

POULTRY NOTES.

By Frank H. Robertson.

The late Subiaco Competition.

Further particulars are to hand as follows :—

Fowls.

Expenditure.

	£	s.	d.
To Pollard—1s. 1d. to 1s. 4d. per bushel (842 bushels)	49	2	0
„ Bran—1s. 0½d. to 1s. 3d. per bushel (120 bushels)	7	0	5
„ Wheat—2s. 10d. to 4s 1d. per bushel (208 bushels)	37	11	0
„ Oats—3s. to 3s. 6d. per bushel (67 bushels)	12	13	11
„ Oil-cake—8s. 6d. per cwt. (7 cwt.)	2	16	6
„ Lucerne Chaff—10s per cwt. (22 cwt.)	11	0	0
„ Barley—4s. to 5s. per bushel (9½ cwt.)	4	6	1
„ Maize—3s. 6d. per bushel (3 cwt.)	2	6	3
„ Meat (1,586 lbs.)	13	4	5
„ Greenstuff	2	3	0
„ Grit (18 cwt.)	4	0	0
„ Salt (½ cwt.)	0	2	0
„ Balance	240	9	4
Total	£386	14	11

Receipts.

	£	s.	d.
By Market Eggs	323	11	11
„ Eggs sold to owners (254½ dozen)	25	0	5
„ Commission on settings sold (184½ dozen)	38	2	7
Total	£386	14	11
„ Balance	£240	9	4

Fowls cost per head, 6s. 10d.

Ducks.

Expenditure.

	£	s.	d.
To Pollard—1s. 1d. to 1s. 4d. per bushel (301 bushels)	17	17	0
„ Bran—1s. 0½d. to 1s. 3d. per bushel (86 bushels)	5	2	0
„ Oil-cake—8s. 6d. per cwt. (5 cwt.)	2	0	0
„ Lucerne Chaff—10s. per cwt. (8 cwt.)	4	0	0
„ Meat (770 lbs.)	6	12	0
„ Grit (20½ cwt.)	4	13	0
„ Green Stuff	1	1	1
„ Salt (½ cwt.)	0	2	0
„ Balance	52	9	9
Total	£93	16	10

Receipts.

	£	s.	d.
By Market Eggs	85	9	0
„ Eggs sold to owners (54½ doz.)	3	18	1
„ Commission on settings sold (26½ doz.)	4	9	9
Total	£93	16	10
„ Balance	£52	9	9

Ducks cost per head, 7s. 10½d.

RETURN OF EGGS.

Hens.	Doz.	*Ducks.*	Doz.
Market Eggs	4,612·6	Market Eggs	1,376·5
Sold to Owners	254·6	Sold to Owners	54·6
Settings sold	184·6	Settings sold	26·6
Breakages	63·9	Breakages	11·6
Total	5,115·3	Total	1,468·11

The Indian Runners averaged 203·33 eggs per bird. The Buff ducks averaged 192·33 eggs per bird.

MONTHLY RANGE OF PRICES (MARKET EGGS).

	Hens.					*Ducks.*				
	s.	d.		s.	d.	s.	d.		s.	d.
July	1	11	to	1	2½	1	8	to	1	2½
August	1	2½	„	0	10½	1	3	„	0	10½
September	1	4	„	0	10	0	10	„	1	4
October	1	4	„	1	0	0	11	„	1	4
November	1	0	„	1	2	0	11	„	1	1
December	1	2	„	1	6½	1	1	„	1	5
January	1	6	„	1	3	1	1	„	1	5
February	1	6	„	1	9	1	4	„	1	5
March	1	9	„	2	3	1	7	„	1	10
April	2	2	„	2	6	1	9	„	2	0
May	2	0	„	2	6	1	10	„	1	8
June	2	0	„	1	5	1	6	„	1	4

THE SECOND EGG-LAYING COMPETITION AT SUBIACO

has made a successful start, and the output of eggs so far eclipses the first month of last year's Competition, viz., Hens, 4,696 against 3,938; and Ducks, 1,368 against 374; but as regards the ducks it must be remembered that there are 6 in each pen this time against 4 last year. The leading pen of Ducks, Indian Runners, have put up a wonderful record, viz., 160 eggs for 31 days. It is also pleasing to note that the first five pens are owned by breeders who have all made their mark as leading exhibitors at our shows. Mr. John Stuart, who is by far our biggest and most successful prizetaker, occupies the foremost position with his pen of Golden Wyandottes, thus affording a striking illustration of the combination of good looks and utility qualities in the one class of bird.

The pen of common fowls, put in by the Department, was the only lot which, in sporting phraseology, laid a "duck" egg for the month. They certainly, and fortunately, cannot win the Competition; they are a bright active-looking lot of pullets, selected from various consignments at the auction rooms; there are no two alike, and to hazard an opinion as to their ancestry would be a conundrum worthy of a "Guessing Competition." The cock bird is a caution, having mostly a frizzled plumage of about a dozen different colours.

The quality of the stock, both fowls and ducks, is far above the last Competition, it is also more varied, several breeds being represented which were absent from the last event.

SUBIACO EGG-LAYING COMPETITION.

First Month's Results.

The following are the results for July of the Egg-laying Competition which commenced at Subiaco on the 1st ult.:—

Ducks.

G. Thomson, Indian Runner	160
H. J. France, Indian Runner	145
Scottish-American, Indian Runner	120
Austin and Thomas, Indian Runner	119
R. A. Dusting, Indian Runner	114
F. King, Indian Runner	109
C. W. Johnson, Indian Runner	105
A. J. Walters, Buff Orpington	93
M. Kynaston, Indian Runner	75
White Wings P. Yard, Buff Orpington	60
J. and T. Robertson, Indian Runner	54
D. F. Vincent, Indian Runner	49
Adelaide P. Yard, Indian Runner	47
Mrs. Mellen, Indian Runner	44
South Perth P. Yard, No. 2, Pekin	35
S. A. McColl, Buff Orpington	11
T. Anderton, Indian Runner	11
Bon Accord, Buff Orpington	9
E. Trenberth, Pekin	8
North Lake E. Farm, Indian Runner	0
South Perth P. Yard, No. 1, Pekin	0
Davenport and Smith, Indian Runner	0
Total	1,368

Hens.

John Stuart, Golden Wyandotte	126
Mrs. H. M. Kelley, Golden Wyandotte	123
A. F. Farrant, Buff Orpington	120
L. Dobson, Silver Wyandotte	119
J. D. Wilson, Brown Leghorn	117
O.K. Poultry Yard, White Leghorn	116
F. Mason, White Leghorn	115
J. and T. Robertson, White Leghorn	111
A. F. Farrant, Partridge Wyandotte	108
S. Craig, White Leghorn	108
A. and G. Buttsworth, Black Orpington	107
White Wings P. Yard, White Leghorn	106
A. H. Padman, White Leghorn	106
Savage and Jones, White Leghorn	104
North Lake E. Farm, White Leghorn	103
C. R. Herbert, White Leghorn	101
Craig Bros. White Leghorn	99
Perth P. Yard, White Leghorn	97
Jack R. Parkes, Brown Leghorn	94

HENS—*continued.*

Gus. George, White Leghorn	91
C. Thomas, White Leghorn	90
Austin and Thomas, White Leghorn	88
O. James, White Leghorn	87
Coolgardie P. Yard, White Leghorn	87
F. E. Tull, White Leghorn	85
Scottish-American, White Leghorn	81
Sunnyhurst, White Leghorn	78
J. Faulkner, White Leghorn	77
J. Stuart, Buff Orpington	76
Bassett and Titterton, White Leghorn	75
Glendonald, Golden Wyandotte	74
E. Krachler, R.C. Brown Leghorn	73
A. F. Farrant, White Wyandotte	70
B. Tonkin, White Leghorn	68
Adelaide Poultry Yard, White Leghorn	67
E. E. Ranford, Black Minorca	67
Mrs. McGree, White Wyandotte	66
Scottish-American, Brown Leghorn	66
O.K. Poultry Yard, R.C. Brown Leghorn	66
C. W. Johnson, White Leghorn	65
Jno. Stuart, White Rocks	65
L. Despeissis, Houdan	64
Mrs. Hughes, White Leghorn	62
Sunnyhurst, Black Orpington	61
Mrs. H. J. France, White Leghorn	60
Master Staines, R.C. Brown Leghorn	58
Buff Poultry Yard, Buff Orpington	57
Adelaide Poultry Yard, R.C. Brown Leghorn	56
Digby Poultry Yard, Brown Leghorn	53
G. M. Buttsworth, White Leghorn	51
R. A. Dusting, Black Minorca	51
Jas. Kirk, Silver Wyandotte	50
Thamar Poultry Yard, White Leghorn	50
W. R. Read, White Leghorn	49
G. A. Innes, White Leghorn	44
Mrs. H. M. Kelley, White Leghorn	40
Mrs. Byass, Salmon Faverolles	29
J. Stuart, Silver-pencilled Wyandotte	27
A. F. Spencer, White Leghorn	27
Craig Bros., Black Orpington	23
B. Jones, White Leghorn	16
D. Young, Black Orpington	14
Honnor and Forbes, Black Minorca	12
Non-competitive, crossbreds	0
Total	4,696

A CORRECTION.

Mr. Wallis, of Trafalgar, whose system of working his incubators I described in last month's notes, has written stating that it is not on the 18th day that a damp cloth is placed on the eggs, but the paragraph should read: "When the eggs show the first pip, the cloth should be put on and left for twenty minutes, after which time withdraw quickly, close machine, and on no account open until the hatch is over."

SAVING SEED.

By G. CHITTY BAKER.

In this article it is intended to deal only with saving seed of all those plants grown by market gardeners.

It is a well-known fact that the best crops are obtained from the seed procured from plants which have been grown on the same ground. In no case is this so striking as it is with regard to onion culture; the seed from the third year's bulbs producing the largest crop. The mode of obtaining the seed is by first selecting the finest bulbs, planting them in the autumn, when seed stalks will shoot up in the spring. The best bulbs from this sowing are again planted, and repeated again the following year. It is not wise however to exceed four years; so that in order to get maximum crops, bulbs from elsewhere should be planted every year and just enough raised in order to supply the required amount of seed from the third year's seeding.

With regard to peas, beans, and tomatoes, so soon as the crop commences to show, plants should be selected and the *first* crop allowed to mature; this is of great importance as it is the first fruits that contain the greatest part of the strength of the plant.

It is well known that if the first lot of peas or beans are picked, the plant will continue to blossom and set more pods until it becomes exhausted; as each picking tends to further exhaust the plants, it can be easily seen that the first lot must contain more vitality than those formed afterwards.

With cucumbers, melons, pumpkins, and marrows, the best of the earliest ones should be marked, the vine pinched back in order to send all the sap into the fruit required to be saved.

Cabbage, lettuce, cauliflower, etc. The best plants only should be saved. A good plan to adopt is to mark off a small plot in the garden in which a few of each of these plants may be allowed to grow, for if one of the plants in the crop should be selected it necessitates the ground remaining idle, until the seed ripens, which, as a rule, is some time after the rest of the crop is removed. Another good object obtained is, that a few plants can be given more attention and so brought to greater perfection than otherwise.

Ripe v. Unripe Seed.

If it is intended to keep seed any length of time, that is a few months, it is better that it should be thoroughly matured and properly dried before putting away. When, however, the seed is to be planted within a week or so, unripe seed may often be used to advantage, especially is this so in regard to French beans, peas, and tomatoes. It has been found that immatured seed increases the productiveness of the pods and fruit at the expense of the vegetation, and maturing the crops much earlier.

Especially is there a distinct advantage gained where the ground is very rich as most of our market gardens are found to be; more especially would the use of immature seed be of great benefit in all gardens on the goldfields.

In a series of experiments conducted through several generations by Goff and Arthur, and described in the *American Naturalist*, it was found that a tomato plant selected as a representative of the series grown from unripe seed bore three and a-half pounds of tomatoes to one pound of vine (leaves, stem, and roots being weighed); while a plant grown each year at the same time from thoroughly ripened seed gave only one and one-eighth of fruit for every pound of vine produced. Besides the increased weight of fruit, the fruit were more in number, but individually smaller.

The reason seems to be that a check is given to the growth of the plant and the usual results happen. The same rule applies, when cucumber and melon vines are pinched back, in order to set fruit earlier; broad beans when topped will give a similar result.

While it must be always remembered that like begets like, care should be taken that only the best be selected for reproducion, just the same as in the animal world, the best only are used for stud purposes. This was impressed on my mind many years ago, by my reading of a farmer's boy who came across a very fine ear of wheat, which he saved and planted by itself, the following year he selected only the finest ears for future sowing, continuing to select only the best and planting them separate; in a few years he had fixed a distinct variety, the grain of which realised just six times as much as that paid for ordinary seed.

RESULTS OF GRASS PLOTS.

During last season a considerable quantity of grass seed was obtained and distributed by the Department. A short time ago circulars were sent out to all those who received seed and the attached replies are some of those received. Many of the results are so contrary that nothing except a visit of inspection can find the reason why one man reports a success and his neighbour an absolute failure.

As a general rule the grasses which have given the best results are African Wonder and Rhodes grass, while the other follow in order of merit, Paspalum Dilatatum, Cocksfoot, Sheeps Burnett, and Chicory. All these are worth a further trial. The attached replies in relation to these grasses are worth perusal by those interested in the subject.

African Wonder Grass.

M. S. Hack, Upper Blackwood.—Roots planted on shallow loam over clay. Grew runners 3 to 4 feet long. Stock like it.

E. M. Fisher, Coolup.—Sown October, on loam. Vigorous and green at end of summer. Does not stand frosts so well as Paspalum dilatatum.

V. Hamersley, Toodyay.—Growing splendidly where plenty of moisture.

A. B. Wright, Bullsbrook.—Sown 19th September, 1906, on white sand with Abrolhos guano. Ran shoots 7 feet long.

F. Craig, Perth.—Sown May, 1905, on sandy loam. More satisfactory than Paspalum. Cutting for fodder preferable to feeding off.

G. H. Whittaker, Subiaco.—Planted on superior swamp land. Grew remarkably well.

P. H. Carter, Busselton.—Planted October, 1905, on sandy soil. Grew splendidly, runners 12 feet long.

J. Mills, West Coolup, Pinjarrah.—Planted January and November, 1906. Had it under water four months. Growth marvellous when swamp dried.

R. R. Harvey, M.B., Norseman.—Planted August, 1905. Not a success under drought conditions. Relished by horses.

A. Burvill, Torbay Junction.—No good for karri land. On swamp land does well only in hot weather, when it grows at an enormous rate. Cattle do not care for it when other grasses to be had.

Rhodes Grass.

C. J. Cook, Walkaway.—Did not germinate.

M. S. Hack, Upper Blackwood.—Planted on shallow loam over clay. Did not grow vigorously.

E. King, Tambellup.—Sown end of September on sandy loam, 3cwt. superphosphate per acre. At end of summer 12 inches high, runners 3 feet long. Would give this first place.

E. M. Fisher, Coolup.—Sown October on loam. Vigorous and green end of summer. Does not stand frost as well as Paspalum dilatatum.

A. B. Wright, Bullsbrook.—Sown 8th September, 1906, on red sandy loam with Abrolhos guano. Six weeks after sowing, 2 inches high. Destroyed by fire in February.

F. Craig, Perth.—Sown May, 1905, on sandy loam. More satisfactory than Paspalum. Cutting for fodder preferable to feeding off.

T. Ryan, Woodanilling.—Sown 9th September, 1906, on sandy loam and clay. Lived through the summer.

G. H. Whittaker, Subiaco.—Planted on superior swamp land. Grew remarkably well.

C. J. Rooney, Stirling Estate, Capel.—Sown 29th July, 1905, on heavy loam and sand. No fertiliser used. Doing first class.

P. H. Carter, Busselton.—Planted October, 1905. Consider this a failure.

H. Hocking, Lake Jandabup.—Sowed 21st December on swamp, 5cwt. bonedust per acre. Grew well till transplanted June. Died during summer.

John Mills, West Coolup, Pinjarrah.—Planted January and November, 1906. Will stand submerging under water a few months.

R. R. Harvey, M.B., Norseman.—Planted August, 1905. Remarkable drought resister. Not liked by stock in winter.

F. Gutman, Capel.—Sown 13th August, on moist sandy soil, 12cwt. bonedust per acre. Few showed up. Some had runners 6 feet long at end of summer.

A. Burvill, Torbay.—Not best grass for swamp, does not get enough heat. Doing well on karri land.

Paspalum Dilatatum.

H. Hocking, Lake Jandabup.—Sown 26th August on wet ground. Mowed twice during summer.

F. Gutman, Capel.—Sown 29th August on moist sandy soil, 3cwt. bonedust per acre. Grew strongly.

A. B. Wright, Bullsbrook.—Planted 2nd November, 1906, on sandy swamp with Abrolhos guano. Very strong and healthy at end of summer.

T. Ryan, Woodanilling.—Sown 9th September, 1906, on sandy loam and clay. Lived through the summer.

A. Monan, Kojonup.—Planted out from roots August and September. Carried three sheep to acre all summer.

W. Marsh, Serpentine.—Sown 31st May, no manure used. Stood the summer well.

E. King, Tambellup.—Sown end of September on sandy loam. Did not stand the summer so well as Rhodes grass.

W. H. Williams, Moonyoonooka.—Gave much better results than Sheep's Burnet.

E. M. Fisher, Coolup.—Sown October on loam. Vigorous and green end of summer. Withstands winter frosts.

W. M. Knight, Yalgoo.—Sown March, 1906, on red sandy loam. Splendid feed, up to 3 feet 6 inches high.

Cocksfoot.

F. Watts, Wandering, via Pingelly.—Sown 1st July on sandy loam with super. bonedust. Condition good at end of summer.

W. H. Williams, Mooyoonooka.—Sown 14th June, 1906, on sandy loam, clay subsoil with superphosphate. Germination very good. Went off early in summer. Not payable.

V. Hamersley, Toodyay.—Sown 1st June, 1905. Germinated, withered up completely in October.

C. A. Piesse, Wagin.—Sown 23rd May, 1906, on fallow land. Stock kept off till end of January. Did better than Timothy, but very sick at end of summer.

W. Marsh, Serpentine.—Sown 31st May, no manure used. Made good winter feed.

F. T. F. Crosby, Katanning.—Sown 8th August, 1905. Doing splendidly on 9th October, 1905.

Prowse Bros., Mount Kokeby.—Sown 25th June, 1906, on red clay. Some lived to end of summer.

H. C. Green, Bellevue.—Sown 31st May, 1906, on dry sandy ground. Thriving at end of summer.

C. J. Rooney, Stirling Estate, Capel.—Sown 27th August, 1906, on sandy loam with little bonedust. Died at end of summer, sown too late in season.

Marwick Bros., York.—Sown June, 1906, on light loam with mixed fertiliser. Died at end of summer.

C. Webber, senr., Moonyoonooka.—Sown June on red limestone soil. Died before end of summer owing to shortness of spring rains.

P. D. Hutton, Katanning.—Sown July on red loam with superphosphate. Did not show up till late spring. Made good growth.

P. D. Durack, Wagin.—Sown June, 1906, with bonedust. Green all summer and did well.

White Clover.

Prowse Bros., Mount Kokeby.—Sown 25th June, 1906, on red loam. Dead at end of summer.

Marwick Bros., York.—Sown June, 1906, on light loam with mixed fertiliser. Growing slowly at end of summer.

C. A. Piesse, Wagin.—Sown 23rd May, 1906, on fallow land, stock kept off till end of January. Died out before end of summer.

H. C. Green, Bellevue.—Sown 31st May, 1906, on dry sandy ground. Did not do so well as Chicory with same treatment.

F. T. F. Crosby, Katanning.—Sown 8th August, 1905. Above ground 24th August, 1905. 9th October doing excellently.

Chicory.

P. D. Hutton, Katanning.—Sown July on river flats, grew remarkably well. Strong and healthy at end of summer. Very desirable for river flats.

Prowse Bros., Mount Kokeby.—Sown 25th June, 1906, on red clay. Green all summer.

P. B. Durack, Wagin.—Results better than any of others tested.

Marwick Bros., York.—Sown June, 1906, on light loam with mixed fertiliser. Best of all those tried.

C. A. Piesse, Wagin.—Sown 23rd May, 1906, on fallow land. Stock kept off till end of January. Did better than White Clover.

H. S. Green, Bellevue.—Sown 31st May, 1906, on dry sandy ground. This and Sheep's Burnett did better than all others tried.

Sheep's Burnett.

W. H. Williams, Moonyoonooka.—Sown 14th July, 1906, on sandy loam, clay subsoil with superphosphate. Germination very good. Went off early in summer. Not payable.

W. M. Knight, Yalgoo.—Sown March, 1906, on red sandy loam. Good feed, but too dry for it up here.

C. A. Piesse, Wagin.—Sown 23rd May, 1906, on fallow land. Stock kept off till end of January. Did better than Timothy.

Prowse Bros., Mount Kokeby.—Sown 25th June, 1906, on red clay. Some lived to end of summer.

H. C. Green, Bellevue.—Sown 31st May, 1906, on dry sandy ground. Thriving at end of summer.

C. J. Rooney, Stirling Estate, Capel.—Sown 27th August, 1906, on sandy loam with little bonedust. Dead at end of summer. Sown too late.

Marwick Bros., York.—Sown June, 1906, on light loam with mixed fertiliser. Growing slowly end of summer.

F. H. Williams, York.—Sown June, 1905, on loam. The best I have tried.

C. Webber, senr., Moonyoonooka.—Sown June on red limestone soil. Died before end of summer.

P. D. Hutton, Katanning.—Sown July on stiff red clay with superphosphate. Favours it as much as Paspalum.

P. B. Durack, Wagin.—Green all summer and did well. Sown June, 1906. Bonedust used.

F. Gutman, Capel.—Sown 13th August on stiff clay. 3cwt. bonedust per acre. Made good growth.

NANGEENAN FARM.

Report for July—August.

By J. Robinson.

I beg to report having visited the Nangeenan State farm and settlement as above.

The fallow is progressing favourably, about 150 acres already done, and at the rate the clearers are progressing we shall be able to get the amount of land fallowed and available for next year's crops as set out by the Hon. the Minister, viz., 300 acres. The team, four horses, are doing their work well.

The growing crops, 147 acres of different wheat, are as follows:—28 acres of Yandillah King, 3½ acres King's early, 40 acres Alpha, 12 acres Rerraf, 8 acres Gallant, 47 acres Baroota Wonder, 4½ acres Macaroni wheat, and about 4 acres of trial lots, all of which look first class and promise a heavy crop, and being mostly on new fallow should be eminently suitable for seed purposes.

The rape, about 25 acres, has been eaten off by the sheep and will come again later on, as the sheep are now put in another paddock.

The grass is coming on well, especially on the ringbarked country.

The ewes (98) are doing well, and 90 first class lambs already tailed.

DISTRICT NOTES.

GERALDTON.

By Inspector W. THOMPSON.

Good rains have fallen in this district and ploughing is in full swing. A little while back the farmers were talking about putting in smaller areas under wheat owing to the low price obtained immediately after harvest for cereals, but they have changed their minds, and as much, if not more, will be under cultivation this coming season in the Champion Bay district. The reason for the change is owing to the glowing reports in the newspapers of the increased price of wheat, both in the Eastern States, and the home market. Both wheat and chaff have risen in price in this district, and the farmers who were in a position to hold are jubilant. There is still a quantity to be sold in this district, one farmer on the Midland having over £2,000 worth of chaff alone in his stacks. It is the small man who suffers in a season like this, as he must dispose of his chaff and wheat as soon as it is harvested. However there is very little grumbling, the Agricultural Bank coming to the small farmers' assistance.

This institution has been a great help here lately, and is more used than formerly, a mistaken idea being prevalent that no loans would be granted as it was too far from market.

This district being further north than others is more favoured, both in cropping and grazing, and already there is a splendid crop of grass in favoured localities, and the stock are beginning to "pick up."

As usual, large quantities of stores are beginning to arrive for fattening purposes for "Yandanooka," "Nangetty," "Uralla," "Newmarracarra," and other stations.

Fine early rains have fallen on the Murchison, and reports are coming in of the good season ahead on the stations there.

A fine consignment of bulls (45) were shipped from Geraldton recently for the North-West from the Murchison stations. This is a good sign, as they have heretofore been imported from the Eastern States.

A "sign of the times" is the fact that a large number of station-holders have gone away on a holiday, the dry summer experienced in these parts being over they are taking a well-earned rest; this summer has taxed even the best water supplies.

From what I can learn when travelling about there will be a large increase in the number of sheep shorn in this district, and there should be a good supply for sale after shearing, but the demand will be greater in this locality as the small farmer is "getting on his feet," and although recognising that a small flock of sheep is the most valuable asset on his mixed farm, has not been in the position to buy them before. The question of lamb-raising for export is very much discussed in this district, and should it become an accomplished fact the Champion Bay and Murchison districts will be second to none in the State, both for quantity and quality. I have had an extended tour right through the Midland district, and the Crown lands are being rapidly selected, and the older settlers are getting large areas under cultivation.

There are some good men on this country, and before long will be heard of as some of our best agriculturalists.

Attention is being given to artificial grasses, etc., for sheep, to tide them over the long summer. Some of the farmers are this year sowing peas, lupins, couch, Rhodes, and other grasses all together, drilling them in with a seed drill with about 20lbs. of superphosphates; this will be left until the summer is advanced and the sheep then put on. The lupin is a great help to the farmer around Moonyoonooka and other places, as the sheep eat it greedily, and will, if allowed, eat it out when the plant is young. The bean itself is a great stand-by in the summer, and sheep fatten quickly on it, and "lupin" mutton or lamb is eagerly sought after.

The only difficulty with this plant for fodder is that at a certain part of the year it affects the young lamb, but this is overcome by arranging the time of lambing.

A large quantity of wheat was shipped from Geraldton recently—over 10,000 bags, and most of this was by the farmers themselves. Messrs. Henry Wills & Co. also shipped a quantity, and that firm deserves credit for giving a fair price for their shipment to the farmers here.

GARDENING ON THE GOLDFIELDS.

LECTURE by G. CHITTY BAKER.

During last month a series of lectures on "Vegetable Growing for Profit" were delivered on the Eastern Goldfields by Mr. G. Chitty Baker, of the Agricultural Department, an epitome of which is given here, at the request of a number of those who were unable to attend.

The Lecture.

A brief reference was made to the fact that it was the very first industry followed by man, and had been continued for thousands of years. The subject was so large and of such antiquity that it was impossible to deal with the various branches at any length in the course of one lecture. The remarks would therefore be confined, as far as possible, to the nature and requirements of the Goldfields. Where there was any depth of soil, say eighteen inches or two feet, the possibilities that existed were very great, and from what could be seen growing on ground that had only been worked he, the lecturer, considered it would be difficult indeed to produce better plants anywhere.

Agriculture was a business—not a science or art. Science, however, had done much to explain what was necessary to be done for the help and guidance of the cultivator in the conduct of his business. Their forefathers had for years pursued methods, the reasons for which they could not have explained. For instance, in the application of lime to the soil, there was an old saying, "Liming enriched the father and impoverished the son." That practically meant that too much lime was put into the soil in some instances that so exhausted the ground that a poor return was eventually got. Now, by the aid of science, they knew what effect lime had upon the soil, what soils required lime, how to lime, and how much to use to secure the best results.

Soils were formed by the weathering of various rocks, to which was afterwards added vegetable matter, which on decomposing formed humus in the soil and so enriched it. This was borne out by the statement that the soil from the forests of deciduous trees was extremely rich in plant food, caused by the continual falling of the leaves, which rotting, was taken into the ground.

Bacteria in Soils.

In virgin soils the richest portion was found in the first twelve inches, and when turned up and worked was known as the top or sweet soil, while that underneath was called sour or sub-soil. The terms sweet and sour, however, were hardly the proper ones to use, rather should it be called live soil and soil wanting life, for it was owing to the presence of bacteria in the soil that plants were enabled to obtain the food required.

In order to illustrate this diagrams were drawn on a blackboard showing the proportion of bacteria existing at various depths in the soil. Bacteria inhabited soil to the extent of millions within a very small compass. He took the quotient of 100 and showed that in the first nine inches of soil there were 75 per cent. bacteria, in the second 20 per cent., and in the third 5 per cent. If the position of the soil were reversed, the bottom layer being brought to the top and the top layer placed at the bottom, the whole of the bacteria in the top spit would be smothered. The sterile soil would be brought to the top, and consequently the growth of plants would be retarded until the newer top had been so worked up until the presence of bacteria had increased from the 5 per cent. to the 75 per cent.

Notwithstanding scientific research, they had very little information concerning bacteria in the soil. The nitrogenous bacteria was, however, a mine of wealth. Peas, beans, clovers, and all other legums attracted them. The Bathurst burr was one of the richest plants on the Goldfields in the possession of nitrogenous nodules. They were the product of the nitrogen obtained from the air by the plants which passed through the leaves and stems and exuding from the roots. The action of the bacteria was to collect the nitrogen and transform the nitritis so collected into nitrates as it was in the later form that it was assimilated by the plants. Besides these bacteria, there existed in the soils countless millions of micro-organisms of putrification which done valuable work. Speaking of legums, the lecturer said it was the practice of their forefathers to sow crops of clover and peas and plough them in under the impression they would do good, not knowing the real cause.

Different kinds of Soil.

He then said: "In all your gardening operations keep your top soil on the top. Work it as deep as you like—the deeper the better—but keep your soil in the same relative positions." They had heard of heavy and light soils. The terms bore no reference to weight. As a matter of fact, a given measurement of sand weighed twice as heavy as clay. The terms "heavy" and "light" were used in regard to horse power. For instance, a team of horses could take a plough through sand easier than they could through clayey soil.

The three kinds of soil met with on the Goldfields were peaty, clay, and sand. Peaty soils were found in damp, moist hollows, where vegetation had grown for a considerable length of time and by decomposition had formed an immense mass of humus; clay was the most retentive and hardest to work, while sand was just the reverse. A peculiarity of peaty and clay soils was their capacity to shrink in dry weather. Peat shrinks 20 per cent. and clay one-sixth of its bulk, while sand retains its normal condition. Shrinkage caused the cracks and fissures so often seen after a spell of very hot weather. The danger of allowing such soils to get hard when a young crop was just coming on would be that in cracking or opening the young rootlets were torn apart. This was made more distinct by diagrams drawn on the blackboard.

Water.

Plants also required water, light, and heat. Water is needed for two purposes, first to dissolve matter so that it can be assimilated by the feeding roots of plants, and secondly to build up the plant tissues. Water or moisture existed in the ground in three forms: 1, as free or hydroscopic; 2, as capillary, and 3, as hygroscopic. The first, free or hydroscopic moisture, was that supplied by the rainfall or when watered, and was obedient to the laws of gravity. Capillary moisture was that which adhered to the soil particles, it ascended, descended or moved laterally through capillary tubes, and its actions were governed by the law of attraction of matter to matter. Hygroscopic water was a film held more tenaciously, and does not run like free water, or yet move from particle to particle as capillary. It is contained in rocks such as limestone and gypsum, it is also in clays, iron-rust, and marl and required heat to abstract it. It was, however, a thorough knowledge of the action of capillary moisture that was most required at present on the Goldfields to ensure successful gardening during the summer. The action of capillary was illustrated by the wick of an ordinary kerosene lamp. The particles of soil lying close to each other acting the same as the lamp-wick by bringing the moisture to the surface which was then evaporated by the heat of the sun's rays.

Manuring.

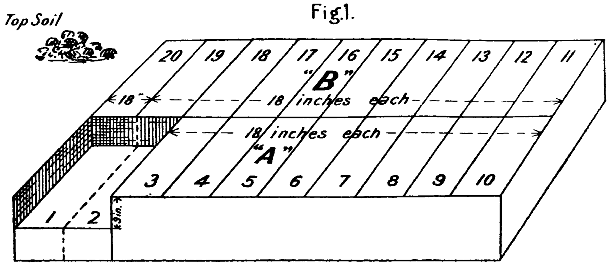
Plant food was made up of about twelve different ingredients, but as the bulk of them was found in all ground upon which vegetation grew he would only deal with the three principal ones. They were phosphoric acid, nitrogen, and potash ; every kind of vegetable grown required these three in various quantities. The Agricultural Department had frequently published the exact proportions of these three ingredients that various crops required. They were all contained in well-rotted stable or farm-yard manure, but in such small quantities that there was very little fear of killing plants by an overdose. By stable manure he meant that manure that accumulated by the use of bedding, which absorbed the liquids, this being the most valuable portion. So far as he had been able to find out, it was only dry droppings that was used on the goldfields. This, however, was of very little manurial value; in fact, a few bags of chaff dug in would be of more benefit.

Chemical Fertilisers.

Phosphoric acid, nitrogen, and potash could also be applied in the form of chemical fertilisers. Phosphoric acid in superphosphates, nitrogen in sulphate of ammonia, and potash in sulphate of potash. There were, however, several other kinds of fertilisers which contained one or other of these three, but he had always used the three named as being found the best for garden purposes. They were called quick acting, by reason of their being easily dissolved ; care should be exercised in the use of these chemicals manures or they might do more harm than good, for if they were used carelessly or lavishly, people might destroy the life of the plant they desired to strengthen. They ought to know that plants were just as susceptible to treatment as was a little child. Sometimes a little brandy was given in water to cure a child's ailment. A tumblerful of brandy to the child, however, was not more injurious to it than a shovelful of fertiliser to a single plant. The fertiliser that would suit the cabbage or lettuce would not suit the carrot or the turnip. It was a safe and the best possible plan in small gardens to apply these fertilisers in a liquid form. Two ounces each of the fertilisers he had named, dissolved in a kerosene tin full of water—half an ounce to each gallon—was a good solution. They could put that on their young plants without injury to them. Bonedust, when required for immediate use, was of little avail so far as the desire to reap the benefit of it right away was concerned. The reason was that almost invariably it took from 12 to 18 months, and in many cases two years, before the virtue in that fertiliser was available for plant food; unless ground

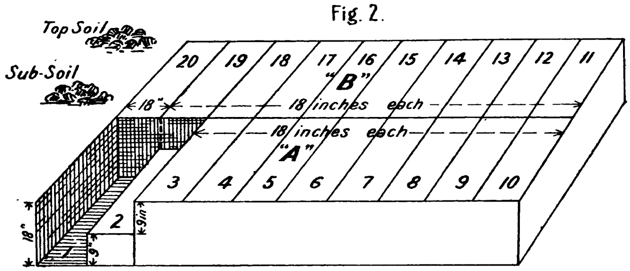
TRENCHING.

Fig. 1.



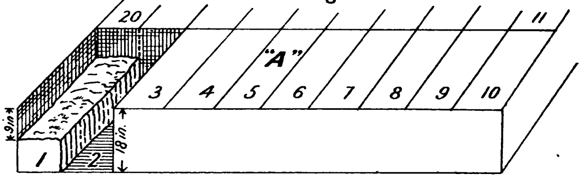
First Operation.—Top spit of first two trenches removed

Fig. 2.



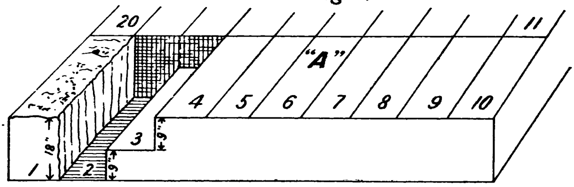
Second Operation.—Bottom spit of first trench dug out and placed in a heap by itself.

Fig. 3.



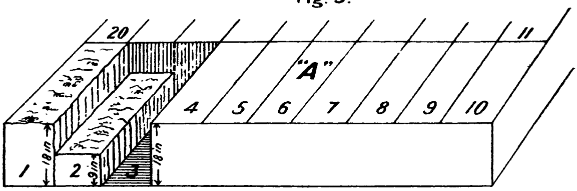
Third Operation.—Bottom spit from No. 2 trench turned over on to bottom of No. 1 trench.

Fig. 4.



Fourth Operation.—Top spit of No. 3 trench turned over on to No. 1 trench and completing that one.

Fig. 5.



Fifth Operation.—Bottom spit of No. 3 trench turned over on to bottom of No. 2. Operations 4 and 5 continued until plot is finished, the top of No. 11 thrown on No. 9, working back until the heaps are reached when it will be found that the soil placed there will fill in the empty trenches and all should be level.

very fine or the soil contained sufficient acid to dissolve the particles. If they had got a place of their own, intending to keep it year after year, then a sprinkling of bonedust every time they dug was like putting money away in a savings bank, because the interest would eventually be of value to them. So far as he could judge the soil on the goldfields was rich both in nitrogen and potash, and he would advise a liberal application of stable manure, more for the purpose of adding humus to the soil, and a little superphosphate—two to three hundredweight to the acre would be a very liberal dressing.

This concluded the theoretical part of the lecture. They would now deal with

PRACTICAL GARDENING.

He could give them no better advice in starting garden operations than that of keeping a diary of all work done. For the last 25 years he had kept a strict account of the sowing, planting, cultivating, cropping, and yield of everything grown in the garden, with the result that it was known exactly when to sow, what to sow, when it will be fit to crop, and probable yield.

Knowledge and forethought is absolutely essential with regard to the proper time for sowing and planting and the quantity to grow, for it is a great pity to see some things run to seed by reason of being sown too early ; and in the other case, the ground being taken up with the crops that cannot be used quick enough while there are no others coming on. Besides this it can always be ascertained by looking back when the market was at its best for any particular crop.

Besides a diary being kept, for which an ordinary school exercise book will answer admirably, a second one should be used for the purpose of keeping a detailed account of sowing, etc. A double page should be given to each kind of vegetable; across the opening the following particulars should appear:—

Date of sowing.	Out of ground.	In flower.	Picked, cut, or pulled.	Total quantity obtained.	Name of seed and seller.	Remarks.

In the case of cabbages, lettuce, cauliflowers, etc., instead of using the words "in flower," "planted out" could be substituted, while in root crops it could be left out altogether.

The great value of such a record, correctly kept for a few years, is hard to estimate. The bottom lines of each page should be devoted to a review of the plantings, giving special note to the best crops, the name of seed, where purchased, the time taken to mature, and the crop secured, so that at the second year's planting, the best results may be followed in order to verify the previous ones. It sometimes took three or four seasons before it could be ascertained as to which particular variety of vegetable was best suited to the locality. It is advisable, therefore, for the first year or two to purchase only small quantities of seed of different varieties until it is proved which does best in your particular case.

Preparing the Ground.

Too much care could not be taken in the first preparation of the ground. The best results could only be expected after the soil had been deeply cultivated or trenched. Trenching was the more thorough and the best means of laying a proper foundation to a good garden. By the aid of the blackboard diagrams were shown as herein produced on a separate sheet.

By trenching was meant the displacing of soil in layers, strips of ground 12 inches to 18 inches wide and nine inches deep being taken off one place and thrown on the top of another. In gardening, however, care must be taken that each layer retains the same relative position after trenching as it did before being removed, and in no case must the top soil be buried, or the subsoil be brought to the top. The proper way to commence is to first divide the ground down the centre, which we will suppose is of an oblong shape. This will give you two strips, which we will call A and B. With a marker strike lines across A 18 inches apart. Next take a spit of nine inches off the top soil of the first two rows, or, as they are termed in trenching "benches," and wheel it into the top of "B." Now take another spit off bench 1 and place in a heap on "B" alongside, but not with that already removed. " A " will now have the first bench 18 inches deep, the second one nine inches deep. The bottom of the first bench should then be treated to a good dressing—any vegetable matter, weeds, corn-stalks, or any thing that will rot. This should be dug in, turning up the bottom of No. 1 bench another spit. Then remove the second spit from No. 2 bench, throwing it into No. 1, working in any good rotten stuff you may have, to form humus in the soil, after which treat the bottom of No. 2 bench the same as you did No. 1. You then commence on No. 3 bench, throwing the top spit on to No. 1, and the second spit on No. 2, turning up the third spit. You then have bench No. 1 completed, bench No. 2 without top soil, and bench No. 3 with the bottom only turned up. This operation is continued until you reach the bottom of strip "A," when the soil required to finish must be taken from the bottom of strip "B," working back on this strip until you can reach the place where the soil from strip "A" was placed, and you will find that this, when filled in, will complete this most important work. The whole should present a level appearance, ready for planting.

It is surprising what a quantity of stuff can be used up in trenching, rakings of yards, sweepings, clippings, and prunings, all of the coarser sorts being dug in with the bottom spit, and the more easily decomposed matter mixed with the second spit ; the richer kinds, such as cleanings from the fowl yards, stables, and manure heaps being used for mixing with the top spit. If this is done properly, not only does it thoroughly enrich the soil by decomposition, but by loosening it the air is enabled to penetrate and sweeten to a very much greater depth than under ordinary circumstances, and above all, the adding of humus to the soil not only loosens stiff clay ground and solidifies loose soils, but it retains the moisture so that garden operations can be continued much longer in the summer than could be done when this system is not adopted.

Sowing the Seed.

Sowing.

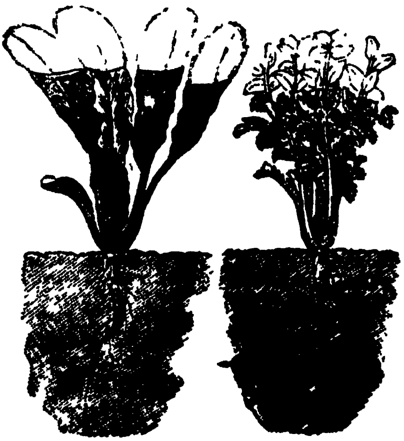
Having prepared the ground, sowing may be at once commenced, always bearing in mind that it is a continuous cropping that is required for family use, not the sowing of the whole of the patch at one time, growing a great deal more than can be used, and then waiting until the next crop is ready. For a family of eight or ten persons, two rows of peas or beans 20 feet long, followed by sowings at an interval of a fortnight, will provide continuous pickings to the end of the season. A strip 20 feet long and 12 inches wide for carrots, beet, radish, onions, parsnips, and turnips, followed by continuous sowings, will be found to be ample. Seed beds two feet square, for cabbage, cauliflower, silver beet, lettuce, etc., will supply all the plants required. The sowing of seed should be regulated by the season, laying it down as a rule that seed should be at a depth equal to three times its circumference ; in winter or on wet ground somewhat less, while in summer and on open soils a little deeper will be found to act advantageously.

In sowing small seed such as cabbage, onions, leek, radish, lettuce, turnips, carrots, and the like, it is well to first get the ground firm and level, sprinkle the seed lightly, and then slightly cover with fine soil, firming all with blows from the back of the spade. A good way was to put the seed into a small big-mouth bottle (say a small boot-varnish bottle), inserting a quill through the cork, and shaking the seed out. It was really surprising how far a sixpenny packet of seed would go when this means was adopted.

As some small seed required to be sown in drills, the best plan to follow was to stretch a garden line across the bed, then with the back of the rake make a slight indentation in the ground, this would not only make a shallow drill for the seed, but at the same time, solidify the soil, so that when the tiny rootlets commenced to grow, they would not at once come in contact with the soil particles ; it also created capillary tubes, and by this means supplied the young seedling with moisture. Peas and similar seed should be sown a little deeper, say half the depth of the rake; while beans should be sown even deeper still.

Transplanting.

The secret of successful transplanting was to do so without subjecting the plants to any severe check. This would be done by sheating, or cutting the tops off, as illustrated :—



Cutting tops off plants when transplanting (Bailey).

By doing this, the food stored in the roots and stem would keep the plant supplied until it became established.

Watering.

This was a most important item on the goldfields. Watering upon the goldfields was something like "liming" in the old days. That was to say, they had been improverishing themselves and enriching the Goldfields Water Supply Administration. (Laughter.) That was a thing which he was sure they did not like, and he knew for himself that the Water Supply Department did not want it to be so. The Water Supply Department would rather see them make 2s. profit for every shilling's worth of water they used, than that they should lose by it. He was going to show them how to use water and make a profit out of every drop they used. He had collected data for himself, which had been supplemented by Observatory records. The evaporation upon the goldfields amounted to 86 inches per annum. They were now supplying water to the atmosphere, and not a drop to their plants. Many upon the fields used water to little advantage. The loss was caused by evaporation from the actions of capillary in drawing the water to the surface. In orchards and crops, where plant life stood apart, that action was checked by continuous surface cultivation. In gardening, however, it was more difficult, but it was absolutely necessary to keep a mulch on the ground so as to destroy all capillary action. By working the top into a fine dust for a depth of two inches, all the moisture was retained in the soil and not a single drop of water underneath would evaporate, except through the plants. There was only one way to water profitably. That was by sub-irrigation. It would not cause a big expense. He exhibited an agricultural drain pipe which was admirably suited for the purpose of sub-irrigation. It was of a porous character. He believed a better article could be turned out on the goldfields. The manufacturers' price was £2 5s. per 1,000. They must have their plots level, and they ought to lay the pipes 12 inches below the surface. The pipes should be placed close together. The end of each would not fit evenly, but that was done purposely to allow of the percolation of water. When a line was laid they should fill the pipes from one end with water. It was calculated that the quantity of water to be used was 12 gallons to every seven square yards twice a week. The proper distance between each row of pipes would depend on the nature of the soil, but he would suggest that a trial be made of about six feet. Where the pipes were placed deeper, say 18 inches, then they might be even farther apart in soils of a close texture, as the action of capillary would convey the water to the plants. By sub-irrigation, the roots of plants were induced to go down into the cooler parts of the soil. When water was applied on the surface, it spread laterally twice the distance it would sink, this was caused by reason of a greater resistance from below in retentive soils ; so it could be seen that by the water remaining on the top, surface roots were formed which, so soon as the moisture was evaporated, these fine delicate roots were often destroyed by the heat of the sun, and the plant received more harm than good by the application of the water when so applied. Besides this, further harm was done by surface watering, as it solidified the fine soil particles and created capillary tubes right up to the surface, which enabled the sun to draw up any moisture stored beneath. Sprinklers in the heat of summer was a most expensive luxury, and so far as gardening went, of very little value. It would be far better, and cheaper in the long run to provide some kind of shade (as exhibited) of hessian, or light trellis work.

He would now tell them how to make

£120 PER ANNUM FROM A QUARTER-ACRE BLOCK.

He quoted a case where a Chinaman had obtained an average of 10 tons of onions to the acre from 60 acres of ground, which, when sold, realised

£6,000. He quoted another case where £400 per acre had been obtained from a crop of celery, and in each case the ground had only been occupied for a portion of the year.

He would divide the quarter-acre into two equal parts, "A" and "B," taking a portion of "B" for seed-beds, manure heaps, tool-house, etc. The whole of the quarter-acre to be covered by either hessian or slats and watered by means of pipes laid under ground as described previously.

On "A" he would plant tomatoes, 18in. by 3ft., which would take 1,210 plants; between these he would sow radishes. In December he would sow cauliflower seed, in the seed-bed, and when the tomatoes were finished the ground could be well manured, dug up, and the cauliflowers planted out, 18 inches by two feet apart, giving 1,815 plants. The tomatoes and cauliflowers would occupy this portion of the ground the twelve months.

On "B" he would plant lettuce, 10 by 18 inches, which would give 2,904 plants, followed by a crop of radishes, after which onions or shallots for salading, followed by a second crop of lettuce and radishes, and finishing with beet-root; the latter to be planted the same distance as the lettuce, viz., 10 by 18 inches, given 2,904 roots. This would complete the twelve months' work on this portion.

The result should work out as follows:—

RECEIPTS.

"A" Plot.	£	s.	d.
1,210 tomato plants realising fruit to the value of 1s. 6d. each ..	90	15	0
1,815 cauliflowers, 3d. each	22	14	0
2,420 bunches of radishes, 12 for 1d.	10	0	0
	£123	9	0
"B" Plot.			
3,808 lettuce (two crops), 3 for 1d.	8	1	4
4,840 bunches of radishes, 12 for 1d.	20	0	0
2,420 bunches of onions, 12 for 1d.	10	0	0
2,904 bunches of beet, 3 for 2d.	4	17	0
	£166	7	4
Less expenses	44	17	6
	£121	9	10

EXPENDITURE.

	£	s.	d.	£	s.	d.
5 tons of stable manure, at 7s.				1	15	0
2 cwt. superphosphate				0	12	0
½ cwt. each sulphate of ammonia and potash				1	0	0
104,000 gallons of water, at 2s.				10	8	0
605 yards of hessian or slats				15	2	6
Seed				2	0	0
2,750 drain pipes	7	0	0			
1,850ft. pine, 3 x 1	7	8	0			
136 pieces jarrah, 3 x 2	5	10	0			
34 pieces jarrah, 3 x 1	3	2	6			
Laying on water	5	0	0			
Tools and sundries	7	0	0			
As the life of the last six items would be several years,	35	0	6			
he only debited that year with				14	0	0
Total				£44	17	6

His hearers admitted that the allowance for expenses was very liberal, and agreed that at least two or three times as much could be obtained for the produce.

The Aphis Question.

In reply to a question as to how they could combat the ravages of aphis, the lecturer stated that if those who had suffered loss by the attacks of aphis or from any other pest, had written down to the Agricultural Department, advise as to treatment would have at once been sent them. His cure was more of a preventative one, for he found that strong healthy plants were very rarely attacked, and it was only when the plants received a check, either in transplanting or by some other cause, that, being weak, they were most susceptible to the attacks of these pests, which speedily made havoc of them. He said that when he transplanted cabbage or cauliflower he made a hot solution of either kerosene emulsion or soapy water in which he placed the plants for a few minutes; after taking them out, he rinsed them in cold water, cut the tops half off, and planted them with a little liquid manure. A good pray was afterwards given of either one or other of the following, their value being in the order placed :—

Tar Water.

Boiling Water	2gals.
Coal Tar	1lb.

Add tar, drop by drop, to boiling water, and stir violently. If the tar is added in bulk it will not mix. When dissolved, make up to 100 gallons with water. Spray under as well as upper surface of leaves.

Kerosene Emulsion.

Kerosene	2gals.
Soap	½lb.

Boil the soap in one gallon of water. When boiling remove to another vessel, add the kerosene and churn violently for 10 minutes, or pour with a fall from one bucket into another until the whole forms a creamy mass, which thickens on cooling. Will keep. When used, to one part of the emulsion add eight to ten parts of water, according to season. The time required to effect a complete emulsion will depend on the violence of the churning and the temperature of the mixture.

Quassia Chips and Whale Oil Soap.

Quassia Chips	1lb.
Water	1gal.
Whale Oil Soap	½lb.

Boil the quassia chips and water for half-an-hour; then stir in the whale oil soap. When using dilute with 10 gallons of water.

Whale Oil Soap.

One pound to two to four gallons water for scale insects; 1lb. to four to six gallons for mealy bugs, aphides, red spider, etc. Good's No. 3 potash soap, one of the best, made of fish oil, and not more than 25 to 28 per cent. water.

Tobacco Decoction.

Home-grown Tobacco, leaf and tem, or Tobacco Waste	1lb.
Water	6gals.
Soft Soap	1lb.

Steep the tobacco in the soap in water, strain, and use in two applications at three or four days' interval.

Watering Trees.

He advised a trench being opened around the tree about three to four feet from the trunk, when a plentiful supply of water could be poured in, say, twenty gallons for a young tree, increasing the amount according to its age ; so soon as the water had sunk into the ground then the soil thrown out should be raked back and kept loose to prevent evaporation.

At the conclusion of each lecture a number of questions were put, that were all answered to the evident satisfaction of those asking them.

PRODUCERS' CONFERENCE.

The following papers were read at the Producer's Conference held in Perth on the 21st and 22nd August.

LAMB RAISING FOR EXPORT.

By T. Wilding.

I have been asked by the Minister for Agriculture to read a paper at this Conference on the breeding and rearing of sheep. For the benefit of those intending to settle on the land and those already on the land who have not had opportunities of practical experience in this direction, I am willing to make public any little knowledge I may have acquired.

In order to bring my remarks within reasonable limits I will confine myself chiefly to the discussion of the question: What is the most suitable lamb to breed for the London market ?

Our natural opportunities in this respect are almost unlimited. Take first the available area. From the Murchison in the North to Mt. Barker in the South we have a belt of country some seven hundred miles long and from eighty to one hundred miles wide, a great proportion of which is suitable for lamb raising. This stretch of country enjoys an assured rainfall and its capabilities may be said to have been proved. We may also take it for granted that the London market for lambs is practically unlimited. Given on the one hand opportunities to supply and on the other an insatiable demand, it is only reasonable to suppose that very soon a large area of this land will be used for lamb raising, since there is no other branch of agricultural industry that will yield quicker and safer returns for a given outlay.

I will deal first with the type of lamb to raise. The most suitable ewe for breeding purposes is a cross between the large framed Merino and the Lincoln, Border Liecester, or Romney Marsh. I favour the Lincoln-Merino cross-bred ewe, as this will be the sheep carried constantly on the land and will produce the fleece of highest value. There are very few of this class of ewe in the State, and I understand it is the intention of the Government to import some of them. There is certain to be a big demand for them and it would pay breeders to produce ewes of this class. These ewes should be mated with Shropshire or Southdown rams—the Shropshire for preference, as it carries a much better fleece.

Last year the skins of the lambs bred on these lines were bringing up to four shillings each at from four to five months old. These crosses give us—

(a.) Quality from the Merino;
(b.) Size from the Lincoln; and
(c.) Uniformity of shape—an essential feature in the English market—from the Shropshire.

Always use pure bred sires. Too much attention cannot be paid to your stud ram. Remember that he is going to stamp your lambs with his own good or bad qualities. When the quality of the ram means several shillings in the value of each lamb each year, it becomes evident that no breeder can afford to run inferior rams. The best is always the cheapest. Your stud ram must be built on right lines. He should be of good symmetry, standing well on short legs, with a good masculine head, not too large; a short, thick neck, good shoulders and brisket, well sprung ribs, good loin, and hind-quarters to match. He should not have heavy shoulders and light quarters behind, but should show evenness throughout. Many people do not look upon the Shropshire as a good sheep for producing wool, but I know of small flocks that are returning an average of 10lbs. of wool per head. If you can procure a Shropshire ram that will cut 15lbs. or more of wool, and also possess the qualities you require for the production of fat lambs, don't let a few pounds prevent your securing him. The extra money will soon come back in the increased value of the lamb skins.

In a paper that I read before the Northam Agricultural Society some twelve months ago I stated that my returns from a flock of 800 cross-bred ewes averaged £1 per head per annum. Last year I did even better than this, 1,000 ewes giving me a return of 21s. 6d. per head. This increase was due to the high value of wool. The lambs were sold at the same price as in the previous year, viz., 14s. per head. The ewes averaged eight pounds of wool, which brought the following prices:—Fleece 12½d., pieces 9d., and bellies 8d. I am sure that this return can be improved upon, as a thirty-five-pound lamb will average not less than 15s. per head clear money for shipment to England. Most of you are familiar with the prices realised last year by the trial shipment, lambs of the first grade returning £1 per head clear to the producer. If you allow for the ewe seven pounds of wool, at 1s. per pound, you will see what a profitable industry it is, and realise the soundness of the advice—try to breed all first grade lambs.

Perhaps the worst pest that the sheep breeder has to contend against is the blow-fly, which strikes the wool on the sheep when it gets damp and stained. Hundreds of sheep die yearly from this cause. I find that clipping the inside of the legs and crutch and going well over the tail during the months of April and May is a sure preventative. The wool taken off in the operation will return more than double the cost of the labour. It also does away with the dagging where the wool is cut to waste, and a man can clip three or four clean sheep in the time he would spend over one daggy one. I have tried dipping with Cooper's dip as a preventative against fly, but it had not the desired effect unless the dipping was done just before lambing. This is not desirable, as the ewes just at the end of the summer are weakening, and the dipping tends to still further reduce them in condition.

There is one other matter to which I should like to invite your attentention, and that is the best method of producing feed. In the first place I need hardly say that small paddocks are essential if you wish to obtain the best results. For early feed I think that rape is going to play an important part. In order to grow it successfully the land must be fallowed and worked down to a nice tilth to enable you to sow in March in readiness for the early rains. This is very necessary, as whilst the ground is warm the rape grows rapidly. I know that many people have tried rape this year without success, but in most cases their failure is explained by the fact that they ploughed back the stubble land and sowed the rape straight away. The land requires to be exposed during the summer months so that it may sweeten and absorb the nitrogen necessary for the growth of rape. In some instances rape has been sown on stiff land, and this again is a mistake. It thrives best in sandy loam. I use about six pounds of rape seed mixed with from one to one and a-half cwt. of super. bonedust and half a bushel of barley to the acre. I put it on with a drill, allowing it to fall broadcast, and then run over it once with a light set of harrows.

Turnips will also be found a beneficial winter feed. I sow in April from one to one and a-half pounds per acre broadcast with the same amount of fertiliser and under the same conditions as rape. It is not necessary for me to enlarge upon the value of turnips as a fodder, and it has been proved beyond all doubt that we can grow them with the greatest success.

There is no crop that I have grown so suitable for summer feed as peas, which come in when the green feed has gone. They can be left in the field to be used any time during the summer when required, and the sheep will retain their condition or fatten on them as long as there is any of the crop left for them to eat.

Recognising the value of these fodder crops, the Northam Agricultural Society has offered substantial prizes in connection with the forthcoming National Show, to induce farmers to give such crops a trial, and it is gratifying to be able to state that numerous entries have been received. Once having tried them I feel sure that farmers will continue to grow them with advantage to themselves and benefit to the State.

Of course if the exporting of lambs is to be carried out successfully, freezing works will have to be established, and although this subject is too large a one to be embraced in this paper, I should like to express my strong conviction that it will be necessary to establish such chambers at Northam, at some centre in the Geraldton district, and at other country centres where they may be required. If all the lambs have to be brought to Fremantle for slaughter and storage there must be considerable shrinkage in weights, which will greatly diminish the profits of the producer.

I thank the Minister for affording me an opportunity of placing the results of my experience in the lamb raising industry before this Conference, and I hope that the information herein contained may be of some value to my fellow settlers.

SHEEP BREEDING.

By J. P. O. Wellard.

In placing this paper on Sheep Breeding before this Conference, I do so with considerable feelings of diffidence, and do so only that the subject may be opened up and that by the discussion that may follow it will throw more and fuller light on the subject and benefit those new settlers who have just entered on the land, and may help those also who are thinking of taking up land in this State. If this paper should in any way help this—and my native State—my object will be more than fulfilled.

In the first place, there are so many things required for successful sheep-breeding, sheep and lamb fattening, and like the security over a farm, *two-thirds* of the *security* is the *man*. A man must have a love for the business; if he has not this he had better try another line in which his tastes lie, and this same love and leaning must also guide him in his choice of breeds and of land suitable to produce those breeds. Therefore, in selecting land the new settlers will do well to consider what class of sheep they intend to breed and for what purpose, whether for *wool, mutton,* or *lambs.* I feel sure the Merino must ever be the sheep of this State, as far as the Northern portion and the drier parts of this State are concerned, Within the heavy rain belt, say from Perth to Bridgetown and back from the coast for 50 or 60 miles, I think the Coarse and Down breeds will give more satisfaction.

It is not my intention in this paper to say which of these breeds a man should go in for. He must, as I said before, be guided by his feelings and the description of country he has. Having settled this point, let him fix the standard he wishes to breed up to, and although he will have disappointments and trials, if he has the "grit" and does not change with every wind of fashion and fad that comes along he will find that his turn will come someday although the other fellow may appear to get ahead of him for a time.

For my own part and my own land, I find the Shropshire to do well with me; and for lamb-raising I do not think the cross between Shropshire rams and large framed Merino ewes for *quality* can be beaten. Lincoln, Leicester, or Romney Marsh breeds give more size in the lambs, and the coarser wool sheep stand the wet country better than the Merino, but I do not think the quality of mutton is so good.

The thing in rearing lambs is to have your ewes in good condition, both before the lamb is born and while the ewe is rearing the lamb; and to do this you must have plenty of feed and not overstock; and with the low price—and heavy railway freights—that chaff is bringing, the farmers would do well to feed more to their sheep, and with this and peas and rape, I think as good lambs both for size and quality can be produced here as in any State in the Commonwealth. The thing is to see that the lambs do not get a check in their growth from the time they are born to the time they leave the station or farm to be killed, and this must not be long if the quality of the lambs is to be preserved.

I have found, by using the "searing iron" this year in "tailing" instead of the knife, the lamb is not thrown back by the loss of blood. There may be some objection to this plan by those who have large numbers of lambs to mark by the extra time taken in tailing; but I am sure that the man who has only a few hundred to mark it will put him ahead with his fat lambs by more than a week; and I think I have the experience of those who tried this in the other States to bear me out.

I have not touched on sheep-breeding from a *wool* point of view, leaving that to the Conference to bring out in any discussion that may follow.

There is a great future before this South-Western part of the State if the settlers will only give more attention to this subject of lamb-raising, and pay attention to their sheep and improve their holdings by *draining, clearing, ringbarking, etc.* But it will be necessary to grow more feed and conserve it for use in time of shortage. But it is marvellous how this land in these South-Western districts responds to cultivation, fertilisers, and *drainage*, and I am sure that before many years these districts will be producing large quantities of lambs and fat mutton, as well as large quantities of fruit and butter and other dairy produce.

DAIRYING.

A Profitable Industry.

By J. A. Kinsella, Dairy Expert.

The subject which has been allotted to me to discuss with our farmers here to-day is that of "Dairying."

Any person who is at all familiar with the development of the dairy industry, and the great strides which have been made in recent years in connection with this branch of agriculture in other countries will at once perceive that the subject gives one an enormous scope to either write or speak on.

In view of the comparatively low prices ruling of late for wheat and fodder crops, such as cut chaff and wheaten hay, and to some extent the unsatisfactory prices obtained for lambs and fat stock, the majority of the small farmers of this State must, at the present moment, be consulting with themselves as to how they are going to get higher cash returns from their land.

In most older butter and cheese producing countries and in some of our sister States, where land and labour have reached such prices as to make dairying return only small profits, particularly is this the case where the methods of our forefathers have been adhered to. These farmers have long since woke up to the all-important question of cheaper production.

In this connection, so far as dairying is concerned Denmark has probably led the way. By proper breeding, selecting, and the culling of the unprofitable milkers from her thousands of dairy herds, she has demonstrated by object lesson to the whole dairy world the only true system of intelligently selecting and building up profitable dairy herds. The United States, Canada, and our other sister States are to-day to some extent taking pattern from Denmark.

The gradual improvement in quality and the keener competition each year on the home markets has also compelled those larger butter and cheese exporting countries to turn their attention to more improved and cheaper methods of production.

We are practically a new country so far as the production of butter and cheese is concerned and I am strongly of opinion that the farmers of this State should turn their attention more to mixed farming, or in other words the time has arrived for our people to follow the example of our sister States by launching out into dairying on a more extensive scale.

Further, I hold strongly that people who say that dairying cannot be carried on successfully and at a profit to those engaging in the business in this State, cannot I am sure, know anything of the extremely cold winters and the trying conditions under which dairying is carried on in many other countries.

In some countries I have had experience in, besides dairying on expensive land and with dear labour, the dairy farmer has a long severe cold winter to carry his cattle through. This makes it compulsory for him to build warm stables at a fairly large expense. In addition he has also to erect a silo and grow and house large quantities of ensilage made from the cheapest possible green fodder he can grow on his own. Some of these countries too are situated long distances from the world's greatest markets, which entails heavy rail and steamship freights on their butter. In addition there are other expenses such as insurance, middle-men's commissions, etc., all of which must be charged up against the product, or, in other words, comes directly off the farmer's profit.

We only require to look to New Zealand where many of the farmers are dairying on perhaps the most expensive land and with the dearest labour in the world. This colony is also situated about the farthest away from the British markets of any of the butter exporting countries. It may surprise some of our farmers to know that I have seen land sold in New Zealand for as much as £37 to £40 per acre ; this land is used exclusively for dairying. Other dairy land often sells for £15 to £18 per acre before the timber is cleared off. Notwithstanding these extremely large prices the farmers are fast making dairying one of the greatest branches connected with agriculture, and it is only a matter of a few years when the exports of frozen meat and wool will have to take second place to the butter and cheese industry.

In Canada, the Northern States of America, Denmark, Russia, and Siberia, winter dairying is now carried on on a fairly large scale. This applies more particularly to Canada and the Northern States of America.

In these latter places dairying the year round is now a common thing where mixed farming is carried out along scientific lines.

Where dairying on this system is in vogue, the farmers arrange to have a portion of their herds come into milk fresh at different periods of the year. In this way a farmer is able to keep his old and trained hands for the whole 12 months in the year, and not as was customary in the olden days to keep his milking hands for five and a-half months only, and then when the spring time came again to look for a fresh lot of men who would require to be educated into the business of caring for cattle, milking, etc.

The growing of suitable forage, summer crops, the making of ensilage, and the silo, has made it possible for the Canadian dairy farmer to bridge over the way of a five to three months' winter, and to carry on dairying at a profit as a business the year round.

Now, it appears to me when it has been possible for the countries which I have just mentioned to achieve so much under such extraordinary conditions, by applying science and skill to dairying, the road should be comparatively smooth for the farmers of this State to make dairying one of the most profitable branches of agriculture.

If we wish to organise a dairy industry in this State on sound and profitable lines, we must profit by the mistakes made by some other countries. It would not do to "dump down" a lot of occupiers on the land and say "Now you fellows must take up dairying, and you other fellows must go in for graining, wheat, vegetables, etc." We must have education and practical instruction. There must also be organisation, and above all, there must be an absolute condition of amenability to good influences, and the true spirit of co-operation on the part of the occupiers of the land. Dairying in many countries is an industry which lends itself to the powerful influence of the conditions which I have just mentioned. When other countries have found that they have been for years milking thousands of profitless cows, and have long since taken steps in a business fashion to cull such cows from their herds and to replace them by money-makers, the farmers of this State should start on proper lines by intelligent breeding and selecting of their dairy herds.

Without the scales and the Babcock test it is impossible for even the oldest breeders and keenest judges to arrive at the true value of individual cows, so far as their producing powers from a butter fat standpoint is concerned.

The question has been frequently asked: Does dairying pay? The answer is yes, if you breed, feed, and dairy on business lines. Energy and main strength are not the only requirements which a man should possess in order to make a success of the dairy business. For this reason the value of agricultural knowledge and a knowledge of the true principles underlying successful dairying cannot be over estimated.

In this State we have what you could scarcely call winter as compared with the countries which I have just referred to. This being so, and the fact that we are able to grow splendid green forage crops in winter, together with the possibilities offering in some of the best agricultural districts for effectively irrigating the land in the summer months, in my opinion makes the outlook very bright.

At the present time we are importing about £400,000 worth of butter, cheese, and condensed milk annually into the State. The question then which seems to be staring both the Government and the farmers in the face is—How are we going to organise on some sound plan to develop our dairy industry on the quickest and most profitable lines to the farmers, and which in the end will be most profitable to the State? When this is accomplished we shall not only be keeping this large sum of money in the State, but we should be within a very few years counted amongst the butter exporting countries.

It may be of interest to my hearers to know something of the many plans adopted by the Governments of other countries to assist in fostering and establishing this important branch of agriculture.

DENMARK.

The area of Denmark comprises 15,000 square miles. In 1906 she exported butter to the value of nearly eleven millions sterling.

She has over 1,000 co-operative factories with over 150,000 suppliers.

There are about 1,150,000 milch cows in Denmark.

In 1895 the Government set aside £7,000 to assist cow testing associations, of which there are now over 400 and which have done so much to improve the dairy herds and their yields in Denmark.

The Danish Government has also established several Agricultural Colleges, Dairy Schools, and Experiment Farms, etc.

The large agricultural dairy college and laboratory at Copenhagen was built by the Government at a cost of about £8,000. The Government also assists agricultural societies by bonuses.

The Danes have built up a special breed of milch cows of their own.

When in 1850 the great depression was on in Denmark the establishing of dairying saved the country.

With her enormous production of bacon, ham, poultry, eggs, etc., which are the by-products of the cow, this branch of agriculture is now bringing into the pockets of the Danish farmers many millions sterling apart from her enormous production of butter.

CANADA.

Private industry first promoted dairying. Later years the farmers started co-operative factories. The Government established a chain of cold storage from Vancouver to London by bonusing private railway companies and steamship companies.

Dominion Government and Provincial Governments control and maintain agricultural colleges, dairy schools, etc.

The Government imported stud stock from Britain to improve the best dairy breeds. Private individuals have done ten times more in this direction: there are hundreds of breeders now in Canada.

The Government also established dairying in the North West by building, equipping and running factories for the farmers until such time as they were going on a sound basis, after which they were taken over and run by the farmers themselves on the co-operative principle.

In 1868 she only exported one million pounds worth of cheese. She now sells Britain 24 million dollars worth of cheese annually, six millions worth of butter, 12 millions worth of bacon, and 11 millions worth of cattle.

NEW ZEALAND.

From 1895 to 1906 the State paid in freezing charges on butter alone £84,000, all of which went direct into the pockets of the farmers.

For practical instruction in factories, dairy classes, grading of produce, etc., she spent in that time £131,000 to encourage the industry.

In 1883 she only exported butter and cheese to the value of £48,912, while in 1905 and 1906 her exports rose to 435,487cwts., value £2,072,591.

Her exports for 1906-7 would reach about two and a-quarter millions.

What I would wish to impress upon our farmers here, is the fact that while dairying was fairly well under way in New Zealand as far back as 1883, her exports of butter were only 8,869cwts. in that year, and it was not until co-operative factories were started and run by the farmers on a system, together with the instruction and advice made available by the Government that dairying began to go ahead on sound lines in leaps and bounds. The assistance given by the State in the way of educating the dairy farmer through the medium of her many experts, and the dissemination of knowledge amongst farmers by lectures and the distribution of bulletins and leaflets, etc., has been responsible for the sound position which the industry occupies in that Colony to-day. The bulk of the dairy business is run and controlled by the farmers themselves on similar lines to those in vogue in Denmark. Co-operation has also developed into a still greater benefit to the man on the land. The dairy farmers now own and control three butter freezing works where they are able to freeze their own butter much cheaper than it was done for them by concerns which previously had a monopoly of the trade.

VICTORIA.

The Government of that State has long since recognised the necessity of assisting such an important branch of agriculture as that of dairying; and while not applying the assistance, in my opinion, in the most practical or beneficial manner which would reach and benefit the farmer in the quickest and most direct manner, nevertheless the assistance given has done good, and is appreciated by a large number of the Victorian dairymen.

The Goverment of Victoria erected a large cold store in Melbourne at an enormous outlay. The farmers' butter is frozen in this work at perhaps a lower cost than at any other freezing works in Australasia. This latter may be partly accounted for owing to the fact that practically the whole of the butter for export from the State is centralised at this one freezing works.

The Government of that State also fosters the industry by teaching agriculture and dairying in the State agricultural colleges, and in addition employs a dairy expert and several instructors.

A few years ago the exports of butter from Victoria were only small. From 1901 to 1905 she had an increase in exports of over 11 million pounds. For 1905 her exports of butter were close on 60 million pounds. Last year she had an increase in butter alone to the value of £374,295 sterling, more than enough to supply the home consumption of this State.

NEW SOUTH WALES.

The New South Wales Government has fostered the dairy industry on practically the same lines as Victoria. She has in the Hawkesbury State Agricultural and Dairy College, a valuable institution, which, under the direction of Mr. Potts, is doing excellent work in the way of educating farmers' sons into both scientific and practical methods of carrying on agriculture and dairying. Last year she exported over £1,000,000 worth of butter, while 10 years ago her exports only amounted to £100,000.

QUEENSLAND.

In this State dairying has gone ahead in a most remarkable manner. It was only during the past few years that the Government paid much attention to developing this important industry. For instance, from 1901 to 1905 she more than doubled her exports of butter, which, for the latter year, amounted to 20,319,976lbs. Her exports for last year were considerably increased.

She now employs a chief expert of the dairy division of the Department of Agriculture, and several instructors. State grading of produce has also been established.

PIG RAISING AND FEEDING.

By Alex. Crawford, Agricultural Department.

This is a neglected industry in this State and one that is capable of extension to the extent of some £150,000 per annum.

It is a large subject, and one that to go into thoroughly would take more time than would be advisable to take up in a Conference of this kind.

I will therefore, to open the subject for discussion, give a few notes of what has come under my own observation and experience.

Breed of Pigs.

I am not wedded to any particular breed, as I have obtained excellent results from Yorkshires (not in this State), Berkshires, Tamworths, and Poland Chinas, and have seen good results with Large Blacks.

To be successful in pig raising the first point of importance is to have pigs of sound constitution and free from all hereditary weakness or disease.

The second point is to have only well-bred animals, by this I do not mean of necessity pure bred. Some of the best results I have obtained have been with cross breds, and by a cross bred I mean not a mongrel, but the cross of two pure-bred animals.

It is not possible to say that one breed is better than another unless it is known for what purpose it is desired to breed.

Some people breed for suckers, in that case what is needed is a sow that will have large litters and rear them well. (I may say here that I am leaving out the Yorkshire breeds entirely, as in this hot climate they have not been found very suitable, although my best results have been with them or crosses with them, and dealing only with the breeds that suit W.A.) A pure Tamworth sow put to a Berkshire boar will generally give excellent results. An average litter of from 10 to 14 may be reared, that grow quickly, and can be sold as well-grown suckers at from six to eight weeks old. By looking well after the sow, three litters may be obtained in 14 months or under. Other people breed for porkers, and for this we may use with advantage the Berkshire, the Berkshire-Tamworth cross, the Poland China, or the Berkshire and Large Black cross. Properly fed we may look for pigs weighing 60 to 70lbs. at from three to three and a-half months old.

If it is a bacon pig that is desired I do not think it is possible to improve on the cross between the Berkshire boar and the Tamworth sow, as regards the quality of bacon produced, that is to have a good proportion of lean to fat.

The late Mr. Hutton won championship honours in many instances in the Royal Shows in the Eastern States with bacon made from this cross. The sows have large litters, with a good supply of milk and kept going by good feeding the young pigs grow rapidly. I have had them average 135lbs. at five and a-half months old.

Next to this cross I consider the pure Berkshire the best bacon producer.

Feeding.

Pigs fed properly are one of the best paying animals on the farm; improperly fed, there may be a lot of money lost in them. The old idea of letting the pigs run as stores until about a year old and then fattened, still holds ground in some places, but it is doubtful if such a pig ever pays for its feed. I quite expect to hear expressions of unbelief at this, but can any of such unbelievers tell me what it has cost to bring the pig to that stage? I do not think they can. They have had a bite here and some corn there and some other food somewhere else, of which no account has ever been kept, so that the cost of bringing them to the age of 12 months is an unknown quantity.

If the results of some hundreds of careful experiments made in England and America under the most stringent conditions were borne in mind, pig raising would pay very much better than it does in many cases now. Epitomised they are: well-bred young pigs from eight weeks to four months old may be expected to put on one pound of flesh for every four pounds of maize, barley, or peas consumed, or four and a-half pounds of wheat. From four months old to seven months one pound of flesh for each five and a-quarter pounds of maize, barley, and peas, or five and three-quarter pounds of wheat. From seven to ten months to make one pound of flesh required eight pounds of the first three kinds of grain and nine and a-quarter pounds of wheat, and in the next six months it took 11 pounds of maize, barley, or peas, and 12½ of wheat to put on a pound of flesh.

In all these experiments the pigs were kept fat and going all the time and had no set backs.

Some mongrel pigs were experimented with at the same time and they required from 15 to 25 per cent. more food to obtain the pound of flesh.

Where farms are situated at a considerable distance from a railway station and grain is grown, it would pay much better to feed wheat to pigs than to sell at less than 3s. or 3s. 3d. per bushel.

When grain is fed all the time the pigs should never be hungry, if so they will not chew the grain properly, but bolt it, and it will pass through them. The best way is to have feeding troughs, and keep always plenty of grain in them, the pigs will then eat lazily and thoroughly masticate their food and there will be no waste.

Another advantage in feeding fully from the start is that you get the pigs the weight required for factory purposes—say 140lbs. at about six months old—and can have three lots on the market, where, under the old method only one lot would have gone; three profits, and greater profits, would be obtained as against one.

I have found that by the free use of roots, such as sugar beet, mangels, and parsnips, or pie melons pulped, and the use of crushed wheat, much better returns can be obtained than with the grain alone. I got one litter of 11 Berkshire-Tamworth cross young pigs to put on a pound of flesh for each 3¼lb. of crushed wheat I used with pulped pie melons : they averaged 89½lbs. at four months and three days old dressed.

There is another reason why well-bred stock should be used, that is the gain in dead weight.

At the Ohio Experimental Farm a careful note was taken of the live and dressed weights of over 1,000 well-bred pigs, and the average dressed weight was 83.4 per cent. of the live weight.

A thousand fat mongrel pigs gave an average dressed weight of 78.1 per cent. of their live weight, so that for every 100lbs. weight in the well-bred pigs the seller gets paid for 5.3lb. more than the owner of a mongrel pig the same weight.

It is not profitable to sell half or three-quarter fat pigs, as the percentage of dressed meat is much lower; half fat pigs only give about 74 per cent. of their live weight, while an extra fat pig has been known to dress 90.3 per cent. of live weight.

Summed up I would say keep well-bred stock only, feed them for all they are worth, and sell them as young as possible.

CATTLE RAISING.

By A. W. Edgar.

The whole question of cattle raising depends on the manner in which it is started, and the kind of stock used from which it is intended to build up your herds.

The secret of the whole industry can be summed up with the following words, viz., get good families of good blood. Keep good sires and feed your stock well. To my mind there is nothing more to be said, and if any breeder follows these few words of advice he will succeed, no matter what class of stock or what breed he chooses to raise. All racing men know the value of running lines of blood in thoroughbreds, and there are in all animals and in the human race also, certain families possessing more good qualities than others, and it is from these good families we should breed from. I place great importance on the sire because he represents half the herd, and the man who has the gift of being able to select a good sire, has a gift very few indeed possess.

The principal points to look for in a sire are constitution, vigour, and style. By feeding well, I do not mean pampering. Many good animals are ruined by over-feeding, but there is a wide gap between giving an animal plenty to eat and pampering.

Culling.—I do not think anyone can get far towards success without culling heavily. Nature gives us some valuable lessons on this point, and we will do well to follow her closely and cull everything without a good constitution and do not let other good qualities weaken our common sense when culling for this important point. There are many points we might cull for according to the requirements the animals are used for by us, but if for milking, beef, or type, let constitution be always uppermost in our mind, and however good their other qualities may be, if lacking in the most important one, cull them out of our herd and out of our sight as soon as possible. Trusting these ideas will be beneficial to beginners.

THE THOROUGHBRED HORSE AND THE INFLUENCE OF PRESENT DAY RACING ON THE BREEDING OF HORSES FOR GENERAL USE.

By J. L. Burns, V.S., Acting Chief Inspector of Stock.

Of late years complaints have been heard from all quarters as to the great deterioration of the Australian horse. Apologists for the turf, whenever the pastime of racing has been assailed on account of its demoralising associations, have claimed that the institution was justified on the ground that it tended to improve the breed of horses. So far as speed alone is concerned, it is not within my province at present to either deny or affirm.

but the contention that the thoroughbred horse has improved in soundness and stoutness may be open to argument.

Sir Walter Gilbey, Bart., says in a recent work, "The animal got by the thoroughbred is, as a rule, handsome but very often shallow in the girth and back rib, light in the barrel, and from 70 to 80 per cent. are leggy and deficient in bone of limb." From my own experience I can testify that diseases of the legs are very common among thoroughbreds: curb, spavin, and ring bone are frequently met with. All along the line the trouble has increased and is increasing.

Short distance racing is, to a great extent, accountable for this state of affairs. Of what practical use is a horse bred from short distance racers, even if there are no radical defects? We talk about staying powers, but what modern horse, even if possessed of far greater speed for a few furlongs, could live in the company of the old racehorses of a century ago?

In support of this statement a comparison between the weights carried in races at the present time and say, 30 or 40 years back, may be made. Nowadays it requires a horse like Carbine to carry 10 stone to victory against the 6 stone division. I find that in 1869 The Barb carried 10st. 8lbs. in the Sydney Cup and won. It was not an uncommon feat in his day for horses to carry 10 stone, now it is exceptional rather than usual. Again, in the days of Babbler, Banker, Ballarat, and others of like renown, it was nothing wonderful in a steeplechase to find 14 stone up on one, if not more, horses. In a steeplechase a little while back the top weight carried was 12 stone 7lbs., and the race won by a horse who carried 8 stone 7lbs. This result might have been altered had the minimum weight been say, 10 stone; the top-weighted division then having a chance.

If racing clubs exist, as they say, for the purpose of improving the breed of horses, and not to provide means of respectable gambling, they have no right to make conditions favourable to those owning and running such weeds as cannot hope to compete with a moderately good horse unless they receive the advantage of 2 or 3 stone. For all horses over 2 years old no races under one mile should be run. If the thoroughbred has deteriorated in stamina it cannot be expected that he will transmit qualities he does not himself possess to his progeny. Under existing circumstances the horse most likely to be at the service of those owning half-bred mares is the degenerate, crippled, weed who, having been nursed and bolstered up, has managed to win a race with 5 or 6 stone up. He is then advertised with flowing descriptions of his wonderful qualities and virtues. If he possessed half of the qualities imputed to him his services would, I think, be dirt cheap at 20 guineas, but the owner, as a public benefactor, asks for no more than perhaps 3 guineas. Is it any wonder that our horses have deteriorated? Various propositions have been made from time to time to improve the breed of horses, and it being admitted that to do this we must first adopt some system whereby a better class of stallions are at the service of the public; it has been suggested that a tax of £10 or £20 would about meet the case. The chief objection to this scheme is that the rich man may, in his ignorance, possess a rank weed, and cheerfully pay the tax, whereas a poor man with even a superior horse would be forced to part with him. The most effective method of dealing with this question would be, I think, in the first place to impose a tax, say, of £50 on all stallions of three years old and upwards, to be imposed and collected by the Government. This plan has much to recommend it, both from the view of improving the thoroughbred and also that of improving horses required for general use.

In the first place, the horse that failed to give satisfaction before reaching 3 years old as a racer would be gelded, which would be a distinct gain, as it would limit the number of stallions running, and these would, of course, be of the first class. In the second place, the horses gelded would be more useful as racehorses, as they would get the allowance for geldings, be more easily managed and trained with less expense and better results; and, most important of all, they could not transmit their many infirmities to another generation.

This suggestion is submitted as perhaps being worthy of the consideration of those who really have the improvement of our horses at heart, although it would assuredly meet with bitter opposition from certain quarters as interfering with the private rights of owners to do as they liked with their stock, but such consideration must not be allowed to stand in the way when a public gain can be effected.

In a country such as Australia where there are long, dry, waterless stages we need a tireless horse, an intelligent and sure-footed animal, not one which knocks up on losing sight of the hay-stack. A departure from the slavish adherence to the types of horses from other countries, where the requirements and conditions are diametrically opposite, would be beneficial. It is not impossible, other countries have done it. England has produced the thoroughbred from Eastern horses, Scotland the Clydesdale, Ireland the Irish hunter, Wales the Welsh pony; all first class of their kind, and suited to the conditions under which they are bred.

Canada and the United States have their purely typical horse, suited to his surroundings, at least until he is trained and sought to be improved in speed.

The Arab alone, according to some writers, retains his useful characteristics, simply because they are cultivated and not sacrificed for the sake of speed as has been done to the total loss of all stoutness in the English thoroughbred, and in the Morgan horse and pacer of the States, which latter have become the American trotting horse, as he is at present known, in which speed is everything; the institution of trots of one mile heats being the chief factor of his decline in stoutness.

Complaints are made of the badly broken, badly educated condition of our horses. An uneducated horse, like an uneducated man, is no use to anybody. What can be expected from the methods adopted and the total absence of any scheme of educating horses for the work required? Equally noticeable are the vicious natures of the horse of to-day; kicking, biting, shying, jibbing, etc., are common, and many prefer not to attempt purchasing a horse, but buy a motor car instead, owing to the great difficulty of either obtaining a docile one or instilling good manners into a young one.

FRUIT MARKETING.

By A. Despeissis.

The rapid and sustained progress of fruit growing during the last 10 years affords one more evidence of the advance made by Western Australia in developing its agricultural industries.

The following table indicates the ratio to the population of the area under fruit during that period:—

Year.	Area under Fruit. acres.	Population.
1897	4,687	155,563
1898	5,577	168,999
1899	6,639	168,528
1900	7,710	176,905
1901	8,621	188,313
1902	9,705	205,755
1903	10,400	221,278
1904	11,262	236,516
1905	13,169	250,207
1906	14,567	259,811

Of that increase the area under apples and oranges come out first and second, viz., in 1905 they represented 5,049 and 1,486 acres respectively. Although these totals of these two kinds of fruit represent a large percentage of the toal acreage under fruit in the State, yet it is evident that the local demand is not yet quite satisfied from local sources.

Last year out of a total of 100,729 cases of fruit imported, 65,350 cases, or two-thirds of the fruit imported, consisted of apples and oranges.

The apple-growing industry may now be said to be firmly established, and from now on that fruit will appear on the list of our exports. Oranges will for a while longer find our local market prepared to absorb all we can produce. A time is coming fast, however, when we must seek in distant oversea markets an outlet for the produce of our orangeries. What those markets are, and from what quarters we must expect competitors in exploiting them, is a question which naturally deserves consideration.

Production.

As more rapid means of communication multiply the channels along which are carried the orange crop of the world, it is interesting to make a note of the extent to which orange culture has been carried out in some of the other countries which supply those markets which we ourselves seek to reach.

Italy and Sicily cultivate 112,000 acres of oranges, producing 800,000 tons of oranges, worth £3,000,000.

Spain cultivates 50,000 acres of oranges, producing 130,000 tons of oranges.

Portugal and the Azores export 4,000 tons of oranges.

France, Corsica, and Algeria produce 10,000 tons of oranges.

Syria exports 10,000 tons of oranges.

The consumption may be said to vary with the means of distribution, and to a great extent with the customs duties of the countries concerned. It has been estimated that—

Italy consumes 80 oranges per head of the population.

United States consumes 50 oranges per head of the population (of which 25 are imported).

England consumes 20 oranges per head of the population.

France consumes 12 oranges per head of the population.

Germany consumes two oranges per head of the population.

Norway and Sweden consumes two oranges per head of the population.

Russia consumes one orange per head of the population.

The United Kingdom imports 100,000 tons, of which Spain supplies three-fifths, Italy one-fifth, and one-fifth comes from other countries.

Those countries which levy duties on imported fruit consume less, for instance, in Germany the customs duties of 4s. per quintal of 100lbs. weighs very heavily against imported fruit; these, I believe, have recently been lowered. In Russia the customs duties are prohibitive and amount to 13s. 5d. per quintal gross, or 15s. 10d. per quintal of 100lb. net, without package. In Switzerland the duty amounts to only 1s. 8d. per 100lb. of fruit, and the consumption is greater. Sweden, Norway, Holland, and Denmark are supplied from England.

Supply.

It is a fact worth noting that the world's market is never bare of oranges. The fruit is, in the first place, one which lends itself to long keeping. In the second place it is supplied from sources situated in temperate latitudes all round the world.

The following table drawn up by an Italian authority indicates the sources of production and maximum to minimum amount of fruit exported to European markets for each month of the year. It is certainly instructive.

—	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.
Brazil	4	10	10	10	7	5	2	...	...	...	...	3
Azores	...	...	...	...	5	10	10	9	7	3	1	...
Valencia	1	...	...	4	8	10	10	10	9	9	8	4
	...	...	...	8	10	10	9	4	...	5	4	...
Seville	...	...	...	...	8	10	9	2	..	...	...	...
Portugal	...	...	...	...	9	10	8	8	7	4	3	1
Sicily	8	10	6	2	...	...	...	...	1	2	5	9
Sorrento	8	10	6	2	...	...	...	...	1	2	5	9
Jaffa	...	...	...	2	7	8	9	10	6	4	2	...
Algeria	...	...	...	...	...	9	10	9	5	4	...	...
*Australia	10	7	4	...	...	...	...	...	...	2	8	10

10 indicates the maximum and 1 the minimum of exportation
* In this case read production instead of exportation.

It is thus seen that the Australian season does not coincide with the seasons of most other producing countries, and for that reason well-grown and graded fruit should sell well on the export market.

It is true that the price of oranges has of late years steadily gone down, but it is also worthy of notice that the demand for the fruit has also increased in a corresponding manner. Cheaper and better organised sea carriage has also been a great factor in the distribution of the fruit, and this is an advantage which is decidedly in our favour, and will place distant markets closer to our reach. Boats going round the Mediterranean gathering oranges and lemons and coming direct to Australia will shortly be seen in our ports with fruit which we can ourselves grow to perfection. A time will come when we will avail ourselves of the same facilities and exploit the larger markets of Europe.

When we begin in Western Australia to pay some attention to the question of irrigation, which is all important in a climate like ours, where the summer is dry, the possibilities of orange culture will affirm themselves to a degree which has not yet been realised.

GRASS CULTURE.

By A. R. RICHARDSON, "Lowlands," Serpentine.

I would not for one moment desire to raise any hindrances against the genuine, the laborious cultivator of the soil. On the contrary, I recognise that Nature yields up her most valuable treasures, her choicest fruits, as the reward of labour and industry, though let it be remembered, labour and industry must be directed and inspired by intelligence, knowledge, and skill, or, in a word, brains; and so I say all honour to him who, yielding his homage to the time-honoured plough and the spade, seeks by patient toil to wrest from Nature's forces and laboratories the largest volume of products from the smallest area of land. But granting all this, there is yet even in old populated countries, but to a much vaster extent in new countries with large supplies of thinly populated areas of land, such as our own State, an immense field and large possibilities open to that class of settler or husbandman who, applying energy, skill, and industry, seeks to not merely make two blades of grass grow where one grew before, but to make a thousand grow where none grew before, and thus entitling him, in a much wider sense, to be hailed as a benefactor of his country beyond the desserts of either legislators or Parliaments.

We need only cite Holland to prove and emphasise our contention, affording as she does a conspicuous instance of a very small country with a considerable population, and yet depending for a large proportion of her national wealth on the fertility of her pastures and the natural products of those pastures—milk, butter, cheese, and even meat, wool, etc.

We hope then we have established the claim to a most important position as a wealth-creating power. Any efforts and enterprise that have for their object that of increasing and improving the quality of our pastures, and the problem that lays very close to and arises from this truth is "How best to accomplish this?"

No doubt where virgin country is under consideration the first essentials are killing the superabundant timber and eradicating the scrub, and in our large country, where there exist some considerable tracts which in their natural state are overgrown with scrub or overstocked with trees, and so produce very little of any kind of pasture, there is a considerable field open for enterprise and solid improvement of a pioneering character. But we have also very large areas over which this pioneer work has been completed in years gone by and great possibilities are still open to the enterprising settler who can economically and profitably increase the fertility and also the quantity of these older pastures. No doubt in the times that are past, when the chief or only source of enrichment was confined to stable or stockyard manure, this problem was quite outside of any profitable solution, but to-day, when artificial fertilisers are obtainable in any quantity and the first cost and the cost of distributing and applying to the land are not absolutely beyond the limits of profitable use, much may be accomplished; and my own experience and experiments incline me to believe that where increased fertility and quantity are aimed at without incurring the expense of actual cultivation—provided economical methods of distributing by aid of suitable and effective implements are studied—simply top-dressing with different fertilisers, such as Thomas' phosphate (which is basic slag), superphosphate, bonedust, sulphate of potash, nitrate of soda, etc., in quantities varying from perhaps 200lbs. to as high as 400lbs. per acre, often yields remarkable results.

Possibly the first question that some of the practical and experienced men I see around me would like to ask me is, Will it pay, and does the result justify the outlay? Well, this is a very compound kind of query, for a great deal depends on the uses you are going to make of the increased yield when you have got it; if merely to graze store and growing stock that may not be marketed for two or three years, it might be a debatable point; but if the resulting products of the improved pasture can be converted into money more immediately, a portion of it in the first year and more the following years, it is capable of proof that there is money in it. One or two of these possibilities are fat lambs and butter and milk. In the case of the lamb: Possibly your ordinary pasture may not be rich enough to produce a fat lamb, and so your ewe and lamb return say, 4 to 6 lbs. of wool between them, or less than that, and the lamb at 6 months old is worth, say, at present rates, about 7s. or even 8s. But if the enriched pastures enable you to turn off a fat lamb in about 4 to 4½ months, worth 11s. to 14s., while it is just within the cards that, with a good-doing sheep, half of your ewes may also fatten same season, and their value increase from, say, if aged, 11s. to 15s. as fats; or in any case she cuts another 1½lbs. of wool; and the following season you also get, without further dressing, a good result even though not to an equal degree—I think you have a good return for your 200lbs. to 400lbs.

of fertiliser, costing, say, 8s. to 12s. But in many places in the South-West where the land with enriched pastures carries two sheep to the acre from June to November, the cost of fertilising *per sheep* is very much reduced. No doubt a proportionate effect would result with milk and butter, more especially I would say in the yield of cream.

But an almost equally important possibility is open to the use of fertilisers on many acres of scrubby and blackboy land, and which in its native state, owing to deficiency in phosphates, grows hardly any grass. Very often I have found from experiments on such land a dressing seems to bring into existence a sprinkling of the trefoil family, and when once there they, by the chemical process of nitrification of the soil, by the microbes on the rootlets of the clover family, go on fertilising the land, and by a kind of natural process seems to start on a course of natural improvement from year to year, having been nitrated by the introduction of fertilisers which supplied what in the first place was deficient.

One important thing to keep in view in all these efforts to improve the land and pasture is to find out by practical trials and experiments which description of fertilisers best suits your land and your climate, as often the fertiliser most highly spoken of in one district bears a bad reputation in another district.

In what I have said I have not touched on the question of artificial grasses and laying them down, etc., but possibly some of you might wish to hear afterwards on that subject. What I have remarked in connection with fertilisers on the necessity of studying the nature of the soil and the climate, when selecting the fertilisers applies here with three-fold force, as grasses that may be a pronounced success with some soils and rainfall may be a conspicuous failure under different conditions. The subject also divides itself into two cardinal channels or divisions—the grasses that require laying down and seeding or planting on cultivated land, and those that may be scattered over the paddocks and spread themselves by automatic seeding and through being fed off and carried about by stock. Paspalum, even in poorish soils with a fairly good rainfall, seems to yield great results where land is prepared and the seed sown in the early spring, but it has not yet proved itself to be a good self-seeder to spread itself about. There are, however, so many publications and text books giving valuable information on grasses and their cultivation that I may not presume to offer any better advice. I would only like to impress this practical exhortation: Keep on experimenting either much or little. Do not too hastily conclude that, because you have tried half a dozen or more kinds of grasses without succeeding in striking one that will thrive and establish itself under the conditions of your land and locality, there can therefore not be a grass in existence that would do so. Perhaps after a dozen failures you may ultimately meet with a very valuable one or two or three of them; though I do say that no doubt there are practical limitations imposed by climate and rainfall which prohibit the idea of finding grasses that will endure through the summer. Our alternative and resource then will, I believe, be found in the cultivation and production of dry forage, such as hay, oats, peas, chaff, etc., harvested either for feeding to stock during the two or three months in the year when natural grasses are too dry or too scarce to sustain any large numbers, or, as our comparatively rainless summers render quite possible, allow the grain fodder to remain unharvested out in the field and in the season when it is required turn the stock in to harvest it for themselves—and it is surprising the number that may be fattened to the acre in this manner, and with self-sown hay alone, by the aid of a good top-dressing with fertilisers. I myself have gathered in stacks of hay that have, with a proportion of paddock grass, sustained two head of large stock to the acre for over 10 weeks; and as the cost of getting this hay into the stack was, inclusive of the cost of fertilisers used, allowing the land to be dressed alternate years, about 10s. per ton, it is a fairly good investment. I also got the use of the land for feeding for more than half the year.

CEREAL GROWING.

By Warren Marwick.

Fallowing and Preparing for Seeding.

My experience is to fallow early (*i.e.*, commence in June and go on as long as you can in the spring), so as to leave the land exposed to the atmosphere as long as possible. Cultivate in September or October, so as to loosen soil after winter rain, as land becomes much settled down. Cultivate again in February or March; always take care to loosen all the soil so as to get a good seed bed. If patches become too hard to work with cultivator in summer it is better to wait for rain; then cultivate before seeding, as it is only wasting seed, fertiliser, and labour by running drill over such patches, as wheat must be under soil or cannot grow.

Drilling.

Grain must not be drilled too deep, particularly when sown early. I consider one to one and a half inches quite deep enough for any grain. I am a firm believer in early sowing, starting end of March or beginning of April; in fact I always adhere to this practice, and have never had to re-sow an acre, and have also had best results from earliest sown land.

I consider it a mistake to await rain before starting seeding, as in many instances the rainfall is too great, and it is impossible to get on to land on account of its boggy state.

Another advantage gained by early seeding is the crops are strong enough to put ewes on during lambing season.

Seed.

It is most important that seed used should be carefully graded. The quantity of seed sown per acre depends on grading of seed, quality of land, and time of year, and whether intended for grain or hay.

Wheat.

When seeding good land for grain (early seeding) about 4 to 5 pecks to the acre is sufficient; for hay, from 5 to 7 pecks, as the thicker the crop the finer the straw. Seeding poor land for grain, 5 to 6 pecks; seeding poor land for hay, 6 to 8 pecks. In sowing barley about 1 peck to the acre more than wheat should be used. In sowing oats about 1 peck to the acre more than barley.

Kinds of wheat to use for seeding (best yielders). For Grain.—Lott's wheat I have had to yield up to 40 bushels per acre; it is also a splendid wheat for hay. Marshall's No. 3 is also a splendid yielding wheat and stands rough weather better than any wheat I know of, also very good for hay.

Steinweidel wheat is a good early variety but must be stripped as soon as ripe as it sheds grain very easily. Is no good for hay. Stubble very good feed for stock.

Barootta Wonder.—A fair wheat for grain but is a splendid hay wheat. Grows tall, fine straw and keeps its colour well; does not break when chaffing.

White Tuscan.—Is a very poor wheat for grain but an excellent hay wheat. Very similar to Baroota Wonder but smaller in grain.

I have grown many other wheats, but am satisfied that the varieties mentioned give the better results in this district.

Barleys.

English.—I find the best varieties are Duck's-bill, Cheralese and Spratt's, there being very little difference in yield of varieties named. I consider that English barley should be sown on loamy soil.

Cape Barley.—I have grown this to some extent, but have not gone in for any particular variety. Pays well, is good feed for pigs, either when the crop is young or later when in ear. It matures much earlier than wheat and also for the grain it yields. Stock do well on the stubble.

A patch of skinless barley—a quicker variety—is of great value for early feeding, particularly as a blood purifier for all kinds of stock. No farmer should neglect to sow at least half an acre of this close to the homestead.

Oats.

Algerian oats is, in my opinion, the most profitable variety to grow both for grain and hay. Calcutta oats is also a very good variety for grain, but it grows too strong and very often blows down, and is then difficult to harvest. White oats are coarse and are not a success in our district.

Fertilisers.

I am a staunch believer in fertilising all kinds of land, more especially for my district in bonedust, guano, and superphosphate of lime, in the order they are named. The first is unfortunately unreliable as regards quality; the same may be said of guano. I have noticed that guano always gives the best results when sown on dry land. Superphosphate I have long used in large quantities, particularly Ollendorff's, which is very consistent and runs freely; Mt. Lyall which is also a free-running fertiliser, and has this season given good results; Lawe's and Globe I have also used.

For good land from 40 to 60 lbs. of superphosphate; the heavier dressing when sowing late. On poorer land from 60 to 80 lbs.

Bonedust I sow at the rate of 100 to 150 lbs., and guano at the rate of 150 to 200 lbs.

Pickling.

All my grain I pickle with bluestone at about 1oz. to the bushel. The seed is placed in bags and lowered into a tub containing the strong solution, and there left for one minute, and drained and tipped into a corn bag and allowed to stand a few days before sowing.

POTATO CULTURE.

By PERCY CARTER.

Potatoes can be grown very successfully in the South-West, and in my district can be planted practically all the year, commencing in June and continuing until the end of February. It is not advisable to plant in March April, or May; there is not enough warmth to develop the crop properly.

Potatoes like a friable loam or a good sandy soil; they do not thrive in clay, as clay soils do not retain the moisture and harden quickly, thus preventing the tubers from swelling properly. This crop succeeds very well in newly broken up land; it is free from weeds and thus saves considerable expense in weeding, but good crops can be obtained from old cultivated land which should be ploughed two or three times before planting, to kill as many weeds as possible. I have tried numerous varieties during the past ten years, and find the American Rose the best all round potato, and have dug 11 tons per acre of this variety.

Farmyard manure, at the rate of 40 good dray loads per acre, spread over the land is a first class manure for this crop, but as the supply of this product is always limited it can be supplemented by artificial manures. I have spread 20 loads farm manure per acre and also sowed a mixture of 6cwt. superphosphate and 3cwt. sulphate of ammonia in the rows, and dug over 11 tons; but on new land 9cwt. of the mixed artificial manure per acre is sufficient and should grow from 6 to 8 tons. By experimenting, I have found that potash does not increase the crop; leaving this manure out reduces the manure 7cwt. Bonedust is also an admirable manure on some soils, but I have not found it satisfactory.

Good seed is essential to success, and seed should be frequently changed. If small seed are to be used they should be showing the first sprout; if old they grow a number of weakly tops and never yield heavily; they are also economical, six bags per acre. If the land is rather wet, especially in swamps, cut potatoes should not be used. Potatoes about the size of a hen egg cut lengthwise make good seed, or large potatoes cut to two eyes are first class and will grow successfully if planted; when much older than small potatoes they are more expensive, eight bags per acre. Seed should be freshly cut; if left for a few days it withers and never grows so well.

When planting I use an Oliver plough, ploughing five inches deep. Sow the manure along the furrow, spreading it about well; plant the seed an inch from the bottom, pressing them firmly thus preventing the furrow horse from kicking them about. The seed should be at least 14 inches apart; overcrowding is a great mistake. Plant evéry third furrow.

Harrow the ground when the planting is finished and again when the first potatoes appear above ground. The second harrowing kills a great number of young weeds, especially if done on a warm day. This treatment looks a bit rough on the young potatoes, but if any one doubts its merits try half the crop, and the result will convince him. When the potatoes are well up cultivate with a horse hoe and earth them up before they bloom; this is all the cultivation necessary.

I have tried several potato diggers but without success. An Oliver plough answers very well, provided the crop is free from weeds, raking the furrow down level; but if not clean a fork is the only satisfactory way to lift the crop. Potatoes dug in summer should not be bagged up at once as they always sweat and some are sure to rot. It is much better to put them in heaps in the field, covering them with straw, rushes, and bushes. By this method they are kept quite cool, and by bagging up just before forwarding for sale arrive in good condition.

It is not advisable to plant the same land two years in succession, especially if artificial manure is used; they never yield well. It is much better to grow rape, kale, or some other crop.

THE RABBIT QUESTION—WHAT THE GOVERNMENT IS DOING.

By Alex. Crawford, Acting Chief Inspector of Rabbits.

The question has often been asked why it was the West Australian Government did not join with the other States in financing the experiments of Mr. Danysz?

It was on my recommendation that it was not done and my reasons were that after reading what it was proposed to do and carefully looking into the results of similar experiments elsewhere, I found that where such experiments had been successful they had always been conducted in moist climates.

Anyone who has studied the question of germs or microbes at all, knows that these require moisture and a certain amount of heat to induce them to multiply quickly, and that strong sunlight and dryness is fatal to them. Also that the germs must be brought in contact with the live animal to be of any use.

The condition of climate obtaining here is such that there is for all practical purposes no chance of the germs retaining their activity when exposed to the sunlight and dryness of our country inland, where the rabbits are, and that with rabbits scattered over such an enormous area there were no means of bringing the germs in contact with the rabbits except in such an infinitesimal number of cases as to make the attempt not worth trying.

The results have amply justified the decision of the Government, for the experiments on an island with a climate the most propitious that could be found have not been a success. How much less then would they be in a dry, hot climate as we have to the East of Kalgoorlie?

What has been done by the Government.

A fence has been constructed from the Great Australian Bight, starting at Starvation Boat Harbour and running almost due North to the Indian Ocean, near Mount Blaze, a point about 20 miles North of Condon. This fence is 1,135 miles in length and is called the No. 1 fence, and is the outside barrier against the rabbits.

When this fence was being made at the Southern end it was found that rabbits had got ahead of it in some places, and that if the agricultural districts were to be saved from their invasion a second fence would require to be erected. This was sanctioned and the second fence, known as the No. 2, was started. This joins the Great Australian Bight at Point Ann, about 60 miles West of the No. 1 fence, and runs in a North-Westerly line, gradually getting more Northerly until it crosses the Goldfields Railway line to the East of Cunderdin; from there it runs slightly West of North to near Yalgoo on the Murchison railway, and then turns gradually Eastwards and joins the No. 1 fence at a place called Gum Creek, to the East of Nannine, a total length of 724 miles.

When this fence was built it was found that a considerable number of rabbits had got to the West of the No. 1 fence in the Murchison country, and to prevent these working to the agricultural country to the South, the No. 3 fence was authorised. This runs almost due West from a point about 20 miles North of Yalgoo to the Indian Ocean, South of the mouth of the Murchison River, and is 160 miles in length. The Agricultural Department have taken over 60 miles of this fence completed, and the balance will probably be taken over in the course of a month or two.

How the Fences are controlled.

There are four Sub-Inspectors, and, roughly speaking, each one has about 500 miles of fencing under his supervision; the total length of fencing is 2,020 miles.

Each Sub-Inspector sees his fence once in about six weeks; if any part is dangerous through flood or fire, more frequently, and reports to me at least once a month, or, if necessary, more frequently.

The boundary riders have lengths varying from 90 miles to 140 miles to look after. Where the track is suitable the work is done on bicycles, and the fence is all seen once in every three or four days. Where the ground is sandy, camels are used, and the fence is seen once in every seven or eight days.

In the Northern section, that is from the 650-Mile North, I cannot say how the fence is looked after, as we have not yet taken it over from the Construction Branch of the Public Works Department.

Formerly the boundary riders had not only to look after the fence and keep it in repair, fill in all scratchings and holes along the fence made by rabbits or dalgytes, and also to keep the scrub and all vegetation down so as to prevent fires getting at the wire netting—as if a fire gets through it the netting is destroyed; the latter work, that of keeping the scrub down, has now been put into the hands of a flying gang, who, in the spring time, go along and are taking everything out by the roots, so that in the future but little attention will be needed for this kind of work. A track is cleared 12 feet wide on the East side of the fences and 6 feet wide on the West side.

I have 1,650 miles under my control at present, the balance will be taken over in a month or two. It is all in good order and well kept under inspection. The height of the netting above ground averages from 2 feet 10 inches to 3 feet, and the depth under ground 6 to 8 inches, except where the ground is sandy, and then it is 12 inches below the surface. There is a top wire 12 inches above the netting, in the South this is mostly a plain wire, but where there is stock a barb wire has been used, and a number of settlers have been given permission to put in an extra barb wire between the top wire and the netting, and thus make the fence dog-proof.

Private individuals under certain conditions are allowed to join their fences to the Government fence and use it as a boundary, and for such part of the Government fence so used a rent of 25s. per mile or part of a mile is charged.

There is no traffic allowed under any circumstances on the track along the fences, and any persons found trespassing are prosecuted. The damage done to the fence by teamsters and the travelling public in vehicles was so great in the way of knocking down posts and damaging the netting that the most stringent measures had to be adopted.

At distances along the fence of about five miles yard traps are erected for catching rabbits, and in some places the rabbits were so numerous that as many as 1,500 to 1,800 rabbits would be caught in 50 miles in these traps in a month. Of late in the Southern part of the No. 1 fence the rabbits have been comparatively scarce, and in the same traps only 20 or 30 a month have been caught.

To the Eastward of the No. 1 fence, South of Burracoppin, rabbits have decreased in numbers in an extraordinary degree in the past two years, and where thousands were to be found a year or two ago there are scarcely any to be seen now. At one time they were so numerous that they practically ate themselves out and starved, and fresh contingents have not yet arrived from the East.

Between the Nos. 1 and 2 fences rabbits are found in small colonies from the coast right up to the Northern end of the fence, and for a time rabbiters were employed trying to keep these in check, but as it is impossible to get the last two or three rabbits, the majority of which are always does, it was decided not to continue the rabbiters, as to be of any service it would require an army of men, and as more bucks were caught than does it was only increasing the number of young ones.

No rabbits have been found to the West of the No. 2 fence in the agricultural districts, although some have followed the Murchison River down, and reached the coast at the South of the Murchison River at its mouth, and have then travelled as far South as Lynton, which is about 20 miles North of Northampton. Rabbiters are employed there at present, but it is found they will not be able to exterminate them, as they have gone into the thick scrub on the sand hills along the coast.

To the North of the No. 2 fence and West of the No. 1 fence in the Murchison and Gascoyne country, a good many rabbits have found their way, and in one or two instances they have actually made warrens, but from some cause or other these have mostly been deserted within a year or two.

Settlers should refrain from killing iguanas, which are most deadly enemies of the rabbit. I have found five good-sized young rabbits inside a large iguana that had been accidentally killed by the buggy wheels going over it. Dingoes also kill large numbers, and so do the large hawks.

The Government has lately decided to give the Rodier system of dealing with rabbits a trial in this State. That is killing off all the doe rabbits possible, and allowing the buck rabbits to go free. This system is so called after a squatter in New South Wales, who was the first to introduce it and who practised it on his own station near Cobar, and was able to deal with the rabbits in his run at a very small expense, while his neighbours were almost ruined by the pest.

Where the bucks are plentiful and does scarce the males tease and worry the females to such an extent that they become sterile and do not breed, often they die and the bucks kill all the young ones they can find. In poisoning and trapping as a rule more bucks are killed than does, as from the habit that the bucks have of resorting to one place to pass their excrements it is easy to trap them, and a decrease in the bucks means more prolific does.

It is recommended then that all persons who catch rabbits alive should allow the bucks to go free, cutting off say one ear so that in case of shooting they can be identified.

The principle is scientifically correct, and if a large number of does are destroyed the remaining bucks will do more to keep the rabbit pest down than any other measure that can be adopted. For this reason settlers destroying rabbits are recommended to try and catch all they can alive instead of poisoning or shooting.

Prospects of the State.

In speaking of the prospects of the rabbits becoming a serious pest in this State I am judging from an experience of 25 years in various parts of Australia, and from a close study of the question for some years past. With the present fences kept in good order regularly patrolled by boundary riders, proper inspection, and the co-operation of the settlers all over the State, I am thoroughly convinced that the farmers have but little to fear and those inside of or to the West of the Nos. 1 and 2 fences, practically nothing.

That there are rabbits between the two fences, and a very considerable number, cannot be denied, and the farmers there will have a continuous, although not necessarily severe, fight to keep the pest down. The fight may be maintained by the individual with success, but it will cost him much more than if he co-operates with his neighbours. Wire netting in the holdings will cope with the rabbit and be expensive. Wire netting in groups of holdings will cope equally well with the rabbit and at only a small proportion of the expense that would attach if each individual provided wire netting for himself; for instance with rabbit-proof netting at £27 per mile, for the netting alone it would cost for a 1,000-acre farm, 100 chains x·100 chains, £135. If 10 people joined together to net 10,000 acres the cost of the netting would be £740, or to each of them £74, as against £135. If 100,000 acres were netted in, the cost of the netting would be £1,350 or £13 10s. for each 1,000 acres, and that would only represent a block of land 12½ miles x 12½ miles. Thus, by co-operation, instead of the individual having to pay for the netting to fence in his 1,000 acres, £135, if 100,000 acres were fenced in by a combination of settlers, the netting would only come to £13 10s. for each 1,000 acres.

I would therefore strongly recommend that before any person purchased netting to fence in his holding he should try if he could not get one or more of the other settlers in the district to join with him—the more the better—and thus have the work done at the minimum of cost.

But even if the rabbits did get in and become the pest they are elsewhere, the farmer can always deal with them. It is the large run holder who will suffer most, especially those who have large areas of poor country where grazing capacity is so small that it would not pay to fence in their holdings: these are those who will suffer most, and it is the squatters who have suffered most in all the Eastern States. In land that suits the rabbit up to the present the destruction of rabbits by poison, trapping, shooting, etc., on such places has not been successful without the use of netting, and so far as I can see, the most likely way and the cheapest to deal with them in our Northern pastoral country will be by the pastoralists carrying out the Rodier system for all it is worth.

It has, however, yet to be proved that the country will suit the rabbit, and observation and reports from the settlers in the North throws a certain amount of doubt on the subject.

If every settler and pastoralist accepts the fact that he is responsible for keeping his holding free from rabbits and acts up to it, I think Western Australia has but little to fear.

I would like to mention that within the past few weeks I went along a portion of the rabbit-proof fence to the North of Burracoppin where there are rabbits at the present time, and I saw a good illustration of the good the rabbit fence is doing. On the outside of the No. 1 fence there was not a blade of grass to be seen; on the inside there was any amount of grass from three to six inches high and any amount of old feed, while on the outside of the fence the old feed had been eaten down close to the ground and not enough to feed even a bandicoot. A better illustration of the value of the fence it would be difficult to find.

COLD STORAGE FOR PRODUCERS.

By A. D. Cairns, Manager, Government Refrigerating Works.

The question first asked by the producer when discussing or reading results of transport, storage, or handling of perishable produce for the market is: Will this method pay me? The answer to this very practical pertinent question is, if you breed, feed or grow stuff fit to comply with the special requirements of the cold store, it will. While the cold storage man cannot be said to be a producer in the strict use of the term, his place in handling raw produce between the grower and consumer is now of vast importance. The refrigerating machine which he directs is the connecting link that couples so many industries together, that if he does not actually produce anything he prevents loss and waste, which after all carries out the axiomatic truth that anything saved is gained. Current practice in cold storage methods is somewhat different to what it was 10 years ago; besides being immeasurably more widely availed of in the arts and manufactures no primary producer can really be said to be progressive who does not avail himself of its aid.

The hardy Alaskan aboriginal rounding up a herd of caribou or moose and heading them towards the snow avalanches, at the time such avalanches need only a touch to start them rumbling to the valley, thereby storing his winter supply of meat to be subsequently dug out as required, has a method of trapping, killing and storing that for economy and skill has never been surpassed by modern science, or any Captain of Industry.

While cold storage was not unknown to the cave dwellers of prehistoric time, it is to the Chinese, though now slightingly referred to as imitators of things Western, we credit the origin of storing natural ice in pits covered with leaves, branches, etc., as early as the eleventh century B.C., for the embellishment of their religious festivals.

Sailing ships brought ice to Melbourne 60 years ago from Norway, now Australasia can place frozen products cheaper in London than such products can be transported from Denmark or Ireland; if the Food Stuffs Commission of the Agricultural Society of Great Britain's Report is to be believed, cold storage is now a serious problem with every civilised nation from the Arctic Circle to the Equator, and from thence South to the Meat Export Works at Punta Arenas, in the neighbourhood of Cape Horn. There is not a ton of butter from New Zealand, a ton of cheese from the furthest factory in Canada, or a ton of salmon sold at St. Petersburg from the Amur River that drains Manchuria, but pays homage to our flag in utilising the invention of Harrison, the Journalist Engineer.

If we here, as producers in Western Australia, cannot also avail ourselves of an invention that made New Zealand, that enriches Australia far beyond the visions of Mort and others of Sydney, who spent half-a-million sterling in its early development and reaped nothing, then, we are not fulfilling the best traditions of our country and race. Failure and loss was the experience of the early investors in cold storage commodities; the tide has not long turned to profit in Victoria and South Australia in their export of fruits and meats. Queensland rose from 1892 till the disastrous drought of 1902 shrunk up her grasses and flocks, and now again she is bounding up, up, in her cold storage commodities export, so that a Premiers' Conference has to emphasise the fact that ample cold storage accommodation must be a *sine qua non* of a Commonwealth mail contract. While the cold storage outlook as a whole for Australasia never looked half so bright, and although freights have been reduced tremendously as a result of its representations, we have a stiff row to hoe here before we step into the arena of export competition in payable quantities.

Local conditions and the special requirements of our State will have to be studied and results tabulated. We have a growing acreage of young fruit trees that cannot be expected to turn out fruit with every essential for the cold store. We have a brief lamb season that promises much if the lamb harvest can be worked with precision. No table meat shrinks in weight, as soon as the grass vanishes, so fast as prime lambs do in this State—so competent authorities inform us.

If the cold store is to benefit the grower we must rub ideas against each other to meet this brief grass season and wrest every hoof from wastage at the right time. If one cold store could handle equal to the whole crop of lambs for the season in, say, New Zealand conditions, it may be that half a dozen may be required here to do the work in the limited time. If the "Celtic" can land Australian apples in New York and sell them there in May at £1 per case as was done this year, we must be certain of our picking, our packing, and the minutiae of trifles that make perfection—for perfection is no trifle.

The necessity for studying the local supply with the view of displacing Eastern produce is strikingly brought home to any observer visiting a cold store in Perth or Kalgoorlie. The bulk of cold storage work is holding food stuffs that have weathered the Leeuwin in the chambers of a coaster. Mutton, pork, and butter can be seen all the 365 days of the year that had its origin somewhere between the Darling Downs of Queensland and the Estuary of the Murray in South Australia. The farmers on a thousand homesteads of the South-Eastern corner of our Commonwealth bless Western Australia and doubtless count our sovereigns while complacently studying the latest Order-in-Council:—

> "That stock from Western Australia are prohibited from entering this State for a period of two years owing to an outbreak of warts on mules in the aforesaid State."

The board of directors of some butter factory in the Northern rivers of New South Wales or the management of some mutton export works, say in Dimboola, calmly negotiate for the shipment of some second grade stuff Westward. Lambs that are interesting in so far as they could easily walk through a 12-inch drain pipe have been seen here, they evidently being too tender for a long sea voyage to London.

To stem this tide is not the work of a day; silos must precede milk production; pork will go hand in hand with butter; and the surplus of a thousand farms with 500 ewes each will stop the inrush of mutton. The question of fruit can be more than offset by tapping the great markets with a surplus now within sight. The rise of dairying in Queensland within

10 years from obscurity to prominence and prosperity was a refrigerator's triumph as much as a cow breeder's. The same might be said of bacon: close on the heels of the separator follows the Berkshire and the Yorkshire, with their square hams and juicy flitches. The old black ruminant pig, which, looked at from the rear, seems to have her hams on her cheeks, gives place to the "square pig" whose body is oblong, and whose frame carries the maximum of meat, and whether chilled, salted, or smoked, is always in demand.

The chilled car problem is also a question by no means settled to the satisfaction of the summer fruit-grower here. Our fleet of chilled cars is seldom out of the railway yard and rarely carry fruit. The British and French railways, as an instance among many, have experimented largely in the direction to provide a good chill car for the transport of fruit. The French suppliers of fruit have a project in hand whereby a car with a small refrigerating machine driven from the axle and the necessary coil apparatus to continuously control the temperature of the contents. Such a car loaded inland in France is to run on to the steamer, continue the journey on the British railways, and carry its load undisturbed right into the market cold store in London. If such thoroughness is essential in the comparatively cool latitude of London, how much more so from Bridgetown or Newcastle to Perth in the summer season? Who can compute the effect of one night in a close, ill-ventilated car standing in a shed on being hauled through the hot ripening air of a day in March? Cooled cars for perishables are as essential as water-tight cars are for the conveyance of water; and, although we may not use them through the fruit being too cheap or the freight excessively dear, some compromise should be arrived at whereby ice-cooled cars should make a daily round of the fruit district in the hot weather, and pay for their axle grease, and incidentally induce growers to send stuff into market that is at present wasted or impaired through improper transport.

So indispensable has the refrigerating machine become that we wonder how the millions of the older countries could be kept from starvation without it. Every modern ship is a convertible floating store, and, as the old order gives place to the new, millions of cubic feet of refrigerated space are added to the total annually; afloat and ashore.

Dr. Collinridge, Medical Officer of Health for the City of London, in his just issued Annual Report says :—"Chilled beef has been coming in larger quantities than ever, and with such regularity that a break in the supply, such as a day or two delay owing to sea fog, seriously affects the whole trade of the market." Also the supply of New Zealand mutton "continues the even tenor of its way. The system of grading has been brought so far into touch with the British ideas as to make it both safe and easy for dealers to give large buyers orders on the Store," which saves cartage, tolls, and loss of condition in handling twice. London distributes 15,000 hindquarters of Argentine beef, and from 40 to 60 thousand New Zealand carcases of mutton weekly.

An International Congress on Refrigeration is to be held in Paris next year, when the work of the Congress will be discussed in four languages, viz., English, French, German, and Italian. Sir Alfred Jones, K.C.M.G., will represent Great Britain, and every section of the scientific, commercial, and agricultural world will be represented. They will deal with cold storage legislation, application of cold storage to transport industries, the preservation of perishable provisions, alimentary industries, temperatures from the physical, chemical, and biological point of view, and many other matters relating to the feeding of armies, navies, and communities.

The Canadian Government Select Standing Committee on Agriculture and Colonisation sat in February of this year. Every question taken up by that conference related to the producers of cheese, butter, and fruit. Their recommendations to the Government has resulted in a large sum being set aside for cold storage development on a big scale.

We have here in Western Australia a score of varieties of apple that could stand a trip four times round the world ; half a score of varieties of pear that could go once round in perfect safety ; oranges and other small fruit that with care could see the British or Continental consumer in good shape at a very good time of the year are here in abundance.

Our beef and mutton will find a market anywhere from Vladivostock where they require 1,000 tons per month for the garrison right round to congested centres of the continent of Europe, where the meat-eating instinct of the masses has to be satisfied with dog or horse meat.

Whatever may be the economies of cellar or barn storage for holding fruit as against the machine-made climate of the refrigerating store, there is no question that the floating cool store and that only can convey our fruits and perishables across the Equator. Our nearer neighbours in the Philippines and Japan have acquired a taste for Australian fruit, meat, dairy produce, and rabbit, and there is no question that their advance in civilisation will mean an all-round increase in the output of the Australasian cold stores.

THE WOOL FIBRE.

One of the great peculiarities which distinguishes wool from hair consists in the wavy or curly nature of the fibre and explanations have been sought for in vain for the cause of this peculiarity. It does not occur within the hair follicle, but soon makes itself manifest after the fibre has passed out of the surface of the skin. No mechanical cause can be assigned for it, although it seems in some way to be occasioned by the irregular contraction of the cells in the two sides of the fibre, first in one direction, and then in another. One cannot detect any feature in the arrangement of the constituent cells which seems to account in any way for this peculiarity, and it appears to be inherent in the very nature of the wool.

In a paper read before the "Queckett Microscopical Club" by Mr. Burgess, the following explanation was given :—"I am of opinion, with respect to the growth of wool, that, as soon as the point of the fibre has protruded through the skin of the animal, a series of growths takes place, a small part of the epidermis is converted into wool, and then a rest ensues. One side grows faster than another, and hence, probably, the curly form of the fibre. When another growth takes place another ring is added, the new growth pushing up the hair from below, and so adding to its length. This process is continually repeated, varying as to the length, straightness, and girth of the joints, and possibly with a variation in the thickness of the cylindrical portion of the fibre."

I do not, however, think this a true explanation, as the epidermis is not converted into wool, the fibre being formed within the hair follicle before its protrusion out of the skin, although the unequal construction of the various constituent parts of the hair, as the cells become more consolidated after leaving the skin, may account for the phenomena. We must remember that the cells which are to constitute the fibre are large and plastic within the lower part of the follicle, and become more consolidated as the fibre is pushed upwards ; the cells which constitute the cortical part become elongated by the pressure to which they are subjected by the shrinking in the outer cells. These outer cells shrink till they completely collapse, and thus form the epidermal plates, although they probably retain the laminated structure, and are capable of expanding again when subjected to variation in pressure, moisture, and temperature ; and, as they shrink in, their gelatinous nature enables them to adhere together till they form a solid epidermal layer, which tightly binds the constituent cells of the cortical part. Unequal shrinking of this ring would give it a tendency to curl. We may also notice that cultivation increases the curl of the wool fibre, and the curl in wool is a most valuable property, and from whatever cause it arises, it seems to increase or diminish, just as the finer and more beautiful character of the wool does.

Mr. Burgess, in the article quoted above, is of opinion that the sole cause of felting in wool arises from the curved nature of the fibre, and has nothing whatever to do with the number of serrations on the surface. He says :—" If a fibre be taken from the Merino, and another from the Lincoln sheep, and be laid side by side, the relative proportion of their curves will be as fifteen to one. If a number of these fibres were taken, each sort separate, it would be seen that the amount of the entanglement between the fibres would be fifteen times greater in the one case than in the other. Suppose that, instead of their natural form, they were laid parallel to each other in a straight line by machinery, each fibre has a natural tendency to regain its original position. Suppose the now parallel fibres are twisted into yarn, and then woven, and the warp is strained tight in the loom, many of the loose threads having been struck down in the sizing process, it is evident that, in this condition, all the fibres are in a state of unnatural tension until they come out of the loom in the form of cloth. All external extension is then removed, in order for the next felting process ; the loose fibres being released, the cloth being saturated with moisture, the whole undergoes a process of heavy thumping, during which each fibre has a pressure applied, first in one place and then in another. I believe that each fibre at every stroke is doing its utmost to regain its curved position, and, as it does so, the cloth contracts and becomes thicker. This thickening is in proportion as the fibres of wool have resumed their curved form from the temporary parallel condition." "This, and this alone," says Mr. Burgess, "is, in my opinion, the true cause of the felting process."

It is well known to our cloth manufacturers that skin wool, or wool cut after death, felts better than if cut from a living animal. Some may ask : How is that to be accounted for? I answer, that in death some parts of the animal are distended and others contracted, and this alteration being communicated to the fibrous curving, there would be more room for the contraction of the fibres in the process of manufacture than those taken off while in the living state.

We think this view of Mr. Burgess is erroneous, because, in that case, very curly hair ought to felt quite as well as wool, but it will not ; and also because the number of serrations are in some way related to the number of curves, and so the two causes probably go together. The very fact that skin wool felts better than wool is an argument in favour of the felting being largely dependent on the nature of the serrations, because, when skin wool is examined under the microscope, the action of the lime, or whatever re-agent has been used in detaching it from the skins, causes the scales to be less firmly attached to the shaft of the fibre, and the free margins to stand out more prominently, and thus increase the felting property.

There are many wools which have a considerable number of serrations, but do not felt well ; but this arises, not from deficiency in curl, but from the fact that the scales have an attachment to the shaft of the fibre more allied to hair than that of wool. We have previously noticed that, in the case of all wools, the direction of the free margins of the scales, or lorications, on the surface of the fibre is always towards the point of the fibre, or in the direction of the growth, and this enables the fibres to slide over each other without felting, which they would certainly do if the free margins of the scales were opposed in direction in contiguous fibres.

The freedom from felting when on the body of the animal is further increased by the fact that the surface of the individual fibres are always covered when in the natural state by a quantity of unctuous or fatty matter, which is secreted from the skin, and serves as a natural pomatum to lubricate the surface of the fibres, and thus enable them to slide over each other with greater freedom. This secretion, which is called yolk or suint, differs in quantity and quality in different breeds of sheep, and appears to have an important influence on the character of the wool by promoting its softness and pliability, as well as preserving the surface of the wool fibres from injury, and thus enabling them to retain the felting property unimpaired until required for manufacturing purposes.

Under certain conditions the wool felts on the back of the sheep, and forms what are known as cots, which are nothing more than a tangled mass of fibres, and are a source of annoyance to the manufacturer and loss to the farmer, as they deteriorate the value of the wool, and have to be removed in the process of sorting. I have frequently found that there is an absence of suint, or yolk, amongst the cotty mass as compared with the free fibres ; but whether this is a cause or effect one cannot say, since the tangling may arise from want of lubrication of the fibres, or the thickness of the felt may hinder the free discharge of the yolk from the skin. This tendency also varies much in individual sheep, and may arise from individual action, such as restlessness or rubbing when lying down, which causes the fibres to be thrown across each other in all directions, and thus they become entangled and matted.

Before manufacturing, the wool has to be freed from this yolk, so as to prepare the fibres for a felting action, and by the process of preparing the wool the fibres are transposed in position, so as to enable the opposing edges of the scales to come in contact with each other and interlock. This they do with great ease and tenacity, and this increases with the quality of the wool and the fineness and sharpness, or pointedness, of the scales. When a piece of felted cloth is examined under the microscope all the fibres are found to be lying in different directions, and the points of the scales driven into the openings beneath the scales of other fibres, and in many instances the fibres are twisted round each other in such a way as to render the attachment of the scales possible on all sides of the interlocking hairs. When subjected to beating and motion the interlockings are rendered more and more numerous, and the scales driven down into each other with such force that it is quite impossible to tear them asunder without the complete disintegration of the fibres themselves.

The sight of such a piece of cloth enables us at once to understand the action of the machine and process termed "milling," where the texture of the cloth is rendered more dense and tenacious. It also enables us to understand why we can make strong threads of woollen and worsted yarns with a far less number of fibres.

There is no doubt, also, that the felting action is further increased by the curl of the wool. It is also a noticeable fact that if we wet a lock of wool the curl is considerably increased ; but if the lock of wool is subjected to tension while wet, and allowed to dry, the curl is completely removed, because the fibre cells take a permanent set under the strain. The same may be noticed in the human hair, especially when it is long. This arises from the fact that the cells in the interior of the hair are more or less pervious to water, which, when it enters, swells them out in the direction of the diameter, and diminishes the length. Upon this principle the hair hygrometer is constructed. When the air is filled with moisture the hair shortens in length, and when dry expands, and thus moves an indicator over a graduated arc, which roughly corresponds to the degree of moisture in the atmosphere. The cause of the curl arises from the fact that the cells are not all uniform in their diameter, or symmetrical in their arrangement, and there is therefore unequal expansion in various parts of the hair, and on different sides, which tend to distort the shape and twist the hair into curly or waved forms.—Condensed report from Lecture III. on "The Structure of the Wool Fibre," by Dr. Bowman.

ADVANCEMENT OF DAIRYING AND AGRICULTURE IN CANADA.

By J. A. KINSELLA, Dairy Expert.

Our new Dairy Expert, who is a Canadian, submits the following brief notes on the advancement of dairying and agriculture in Canada, which may be of interest to farmers of this State :---

After being away from Canada for nearly five years I was amazed to find, during my recent visit home, the great strides which had taken place in the direction of improved methods in the carrying out of nearly all work in connection with agricultural pursuits. Each year greater energy and more skill is being applied towards cheapening the cost of production and improving the quality of the farm products.

In agriculture, improved methods of cultivation are very marked. Mixed farming is becoming more general, even in the great wheat belts of Manitoba. The farmers have become alive to the fact that to go on for years continuously cropping the land with wheat and other cereals, the soil is becoming partially exhausted. The carrying of more stock on the farms, or rather combining dairying with grain growing, enables the mixed farmer to return more plant food to the soil in the form of manure.

This lesson might be copied with beneficial results in some of our purely wheat-growing districts in Western Australia.

Selection of Seeds.

While a great deal has been done by better cultivation of the soil and fertilising, much more has been accomplished just recently by the careful selection of seeds—that is to say, as far as more scientific farming is concerned. A good deal has been done at experimental stations to accertain the most profitable varieties for farmers to grow, and good results have been produced by introducing good varieties. The level-headed thinking farmer, however, is not satisfied with slight improvement, but is anxious to continue improving. Many farmers think that if they have a good variety of seed this is all that is required. This is a mistaken idea according to many of the most scientific farmers in Canada. It is claimed that even with a high-class variety you cannot rely upon it retaining its original value without careful selection of the seed from year to year. The whole question of the selection of seed-grain seems to me to be in the most careful discrimination between superior and inferior grain.

A large number of experiments were conducted at the Guelph (Ontario) Agricultural College for from five to nine years, and I beg to quote briefly from a report by Professor C. A. Zavitz : "Selections were made from spring wheat, barley, oats, and peas. These selections were made from fresh seed grown in large fields each year. The method adopted was to secure an equal number of large plump and small plump seeds of each variety or kind of grain. Taking the average results of the four classes of grain, it was found that the large plump seed produced 5.3 bushels more per acre than the small plump grain. The most marked difference in the results of the two selections of seeds was found in the experiments with oats, the large plump seed producing nearly 12 bushels per acre more than the small plump seed. Many other exhaustive experiments were carried out along different lines, including selections of large plump, small plump, and shrunken seeds. One of the main objects of such experiments was to find out the influence on the comparative size of the seed produced after continuous selection along a definite line. As a result of such experiments it was found that in all cases the yield from the large plump seed was considerably larger than the yields from the other classes of seed. It was also definitely proved that in the case of peas and winter wheat, split seed was decidedly inferior to the selected plump grains for seeding purposes. Many farmers in the Northern States have greatly increased the yields of their cornfields by careful selection. In the case of sugar-beets the same may be said. The percentage of sugar in the juice of the roots has been greatly increased. In some cases it was found that by right scientific methods the increase was nearly 200 per cent."

In an address given before the Farmers' Institute meeting in 1904, Mr. Leonard M. Newman, of Ottawa, wisely points out that in careful field selection we have the advantage of having a larger number of plants to select from, and we have the advantage of knowing the plant itself, which is of prime importance. He further states that in order to procure the best results we must select from the most healthy and vigorous plants those which have produced superior heads having the largest number of spikelets—in fact, the careful breeder has numerous things to watch. He must have a clear idea of what he wishes to secure ; for example, he may not only wish to keep up the yield, but also to develop a stronger-strawed variety out of a weaker one. Whatever be the characteristics he is after, he must select from those plants which show these in a more marked degree than those which surround them.

Perhaps no living man has done more towards advancing agriculture and dairying in Canada than Professor J. W. Robertson, late Commissioner of Agriculture and Dairying for the Dominion Government. For a number of years past he has been making a careful study of the selection of seeds. He has also proved by practical experiments at the Government experimental and private farms that many thousands of dollars could be added to Canada's grain-production by adopting his well-thought-out and practical scheme of seed-selection.

The possibilities of Professor Robertson's method of improving Canada's cereals were seen to be so wonderful that in 1900 Sir William MacDonald, of Montreal, gave over 10,000dols. to be distributed to boys and girls on the Canadian farms in the form of prizes. This was done to encourage the children to carefully observe and study the benefits to be derived from making for themselves a systematic selection of seed-grain year after year. The competition covered a period of over three years, and so marvellous were the results that an association, called the MacDonald Robertson Seed Growers' Association, was formed with a view to further encouraging the production and general use of seed of superior quality for the raising of farm crops. The Dominion Government has recognised the value of this important work to such an extent that it now grants sufficient money to the association to enable it to carry on the work exhaustively and effectively.

Mr. Newman, in his address already referred to, states that it is not too much to hope that most of their economic plants can be made 25 per cent. more valuable than they are at present. He further adds that the Province of Ontario alone produces 110,000,000 bushels of oats annually. Now, if this crop be valued at 30 cents per bushel, it would mean 33,000,000dols. to the province. If, on the other hand, careful selection was followed, and none but high-classed seed was used, this careful breeding—just as in breeding up a good herd of cattle—would mean, taking for a basis 25 per cent. more of a yield, about 25,000,000 bushels to this one province, and this at the same price would mean an increase of nearly 8,000,000dols. for oats in one province alone.

Experimental Farms.

It is thought by many people that Experimental farms should be run and worked at a profit. I have heard it stated that the experimental farms in the State do not pay. That contention might be set off by pointing out that hardly ever do we find any class of education successfully and effectually carried on at a profit to the State, whether it be the educating of young children, or of the farmer to newer and cheaper methods of producing on the land.

The above being so, I beg to point out briefly a few of the many things which Canada is doing to assist the farmer in the way of educating him how he can produce more at a smaller cost.

Canada to-day possesses five main experimental farms :—

1. The Central experimental farm at Ottawa.
2. Nappan, in Nova Scotia.
3. Brandon, in Manitoba.
4. Indian Head, in the North-West Territories.
5. Agassiz Farm, in British Columbia.

In addition to these main farms; the various provinces maintain their own experimental farms on a small scale. The main farms, which are run and controlled by the Dominion Government, are not worked solely for profit. The experiments are carried on for the purpose of illustrating and demonstrating the best methods of tilling and cultivating the soil, and to ascertain the best kind of phosphate manure, and the proper amount to be used. Experiments are also carried out to ascertain the best varieties of cereals, vegetables, fruit trees, etc., etc. The breeding, feeding, and diseases of cattle are carefully studied on scientific lines. Trial tests are carried on with various kinds of modern farm implements and machinery, in order to prove to farmers what can be done towards cheapening the cost of production and also saving time and labour. Accurate results of all such experiments are published in atractive but practical bulletins, which are distributed amongst the farmers, free of cost. This latter, in my opinion, is a mistake, for the reason that I believe that if the farmer was called on to pay a small sum for such valuable information he would appreciate it more, and there would be more likelihood of his carefully studying it, and perhaps a greater possibility of his putting the advice into actual practice. I venture to say that this opinion would apply to N.Z., where many thousands of valuable bulletins are distributed amongst the farmers free of charge, and where they are often thrown carelessly to one side, and six months after the farmer writes to one of the departments asking for the exact information contained in such bulletins which have been lost.

The central experimental farm is situated near the city of Ottawa, being only three miles distant from the main part of the city ; this, in addition to having the electric trams running direct to the farm, accounts in a large measure for the thousands of farmers and others who visit this place, which is intended to act as a bureau of information for the two principal provinces, viz., Ontario and Quebec. The farm comprises nearly 500 acres of good land, being a mixture of heavy clay and loam.

The buildings are composed of a large barn, with two wings, having a basement and manure cellar. There is also a large silo with a capacity of 350 tons of ensilage ; then, too, there is a dairy where practical dairying is carried on. In addition, there is a granary, seed-testing house, root-house, poultry houses, piggeries, sheep-houses, etc., etc. There is a fine residence for the Director in charge, a commodious laboratory, museum, and offices. Other residences for the Staff, and cottages for the labourers are so built and arranged—as far as comfort and convenience to the work are concerned —as to leave little room for fault.

Amongst the many scientific experiments carried on at the farm, perhaps none has attracted more attention than that of the selection of seeds, and that of producing new varieties of cereals by cross fertilising. This question I have already referred to. At the main farm alone, between 25,000 and 30,000 packages of selected seeds were sent out to farmers in one yeor ; besides this, the same system is followed at the other experimental farms throughout the country. Demonstrations are given to farmers at the farm, in the cutting of ensilage by machinery, and in the proper methods of storing it in the silos, so that it may be cured in a proper and uniform condition without waste.

At the dairy, various breeds of milch cows are kept, and not only the best methods of breeding are studied, but the individual testing of the herd is conducted on similar lines to that which exists in Denmark. This latter system of weeding out the inferior milkers from herds is now receiving a great deal of attention by dairymen. There are a hundred-and-one things studied at this farm, but space will not permit of my mentioning them. The Director in charge is Dr. William Saunders, LL.D.; J. H. Grisdale is the Agriculturist ; Mr. Jas. Fletcher, LL.D., is the Entomologist and Botanist ; Mr. T. F. Schutt, M.A., is the Resident Chemist ; Mr. A. C. Gilbert is in charge of the poultry experiments.

I cannot pass without saying a word about the Ontario Agricultural College at Guelph. This college and farm of nearly 600 acres is operated and controlled by the Provincial Government of Ontario. Although similar experiments to those carried out at the Dominion experimental farm at Ottawa are carried out, the essential aim of the Agricultural College and School is to equip the young sons of farmers with a thorough practical knowledge of every branch of agriculture, including dairying. When each student has completed a course and passed an examination at the college, he is granted a diploma of proficiency. This farm is equipped with the most modern buildings, machinery, and implements. Almost every breed of cattle is kept, also divers breeds of sheep, swine, and poultry. The dairy school in connection with this college is one of the most valuable branches of the work carried on. About 250 students attend this school in a year. Tuition is given free to all Canadian citizens. During the past two or three years, a number of students from the Argentine Republic attended the college. There is a fee of about six guineas for students outside Canada. Such a school is—as I have pointed out repeatedly in my reports—invaluable, for the reason that butter and cheese makers must be thoroughly qualified in all branches of butter and cheese making and milk testing before diplomas are granted. Men holding these diplomas are in a better position to obtain billets as factory managers ; and also, the factory owner is, to a certain extent, protected from employing incompetent butter and cheese makers when he knows that such men hold diplomas. While this is true, I do not wish to convey the idea that all butter and cheese makers who hold diplomas make first-class managers. It depends a good deal on the skill of the man, and the amount of energy put into the business after such training has been gone through ; yet we avoid engaging the cheap and unqualified man. The President and Director of this college is Dr. Jas. Mills, one of Canada's ablest agriculturists. They have a highly qualified staff of bacteriologists and chemists, and in Professor Dean—who is in charge of the home dairying department— they have an able adviser.

Manual Training in Schools.

Technical education has a direct bearing upon the manufacturing industries of any country, and I am firmly convinced that technical training or manual training is equally important in agriculture. What is called the MacDonald Institute is established for that purpose at Guelph, in Canada, at a cost of nearly £15,000. This institution is designed for instruction in nature-study, household science, and practical manual training. The money for the establishment of this great work has been donated by Sir William MacDonald, of Montreal, Canada. If it were possible to bring about the establishment of a similar training school or schools in this colony, I am sure great good would result from such work to the general community. The Farmers' Union, being such a strong body in this colony, could, I am sure, make their influence felt with the whole farming community, as well as with the Government, in pressing their claims for more technical education and manual training in connection with agriculture. I am of the opinion that some greater attempt should be made to increase the interest of the students in life on the farm in the way of teaching them by technical education or manual training and more of nature-study.

A great deal had already been done in Canada for the development of technical education in the high and public schools, and recently the importance of applying more of such technical education and manual training to agriculture has been recognised. Professor J. W. Robertson has just resigned the Commissionership for Agriculture and Dairying in Canada in order that he may devote the whole of his attention to this great work. He is responsible in a large measure—and to him the honour is due— for initiating this scheme of manual-training schools and technical colleges. A large institution has been erected near Montreal, Quebec, by Sir William MacDonald, where the student are given instruction in search work, experimental and payable farming. Arrangements are made to allow many students from other schools to devote a number of hours each week to study in this institution. There is no charge made at this school. Professor Robertson has always been a strong advocate of closer union between the farm and the college, and his success has been so great that Sir William MacDonald has recognised it to the extent that he is spending thousands for no other purpose than to bring about higher education amongst the young sons of farmers in Canada, or, in other words, to induce more young men to remain on the land instead of drifting into the cities and towns.

BACK TO THE FARM.

W. H. Strong, Lucas County, O.

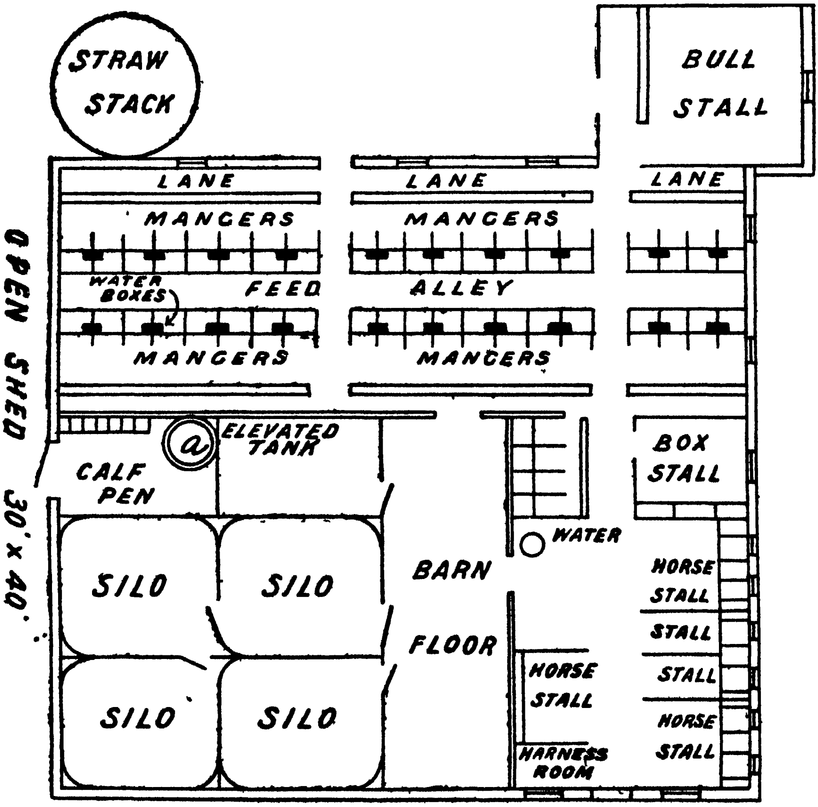
I sold my farm and invested in Toledo property when about 35 years old. It came on hard times and I lost nearly all I had. I then rented a large farm 16 miles west of Toledo, for a time. Later I purchased an old, run-down farm of 100 acres on long time in 1881. It had been rented for some years. It is a dark clay, loamy soil, bordering sand openings. It was without ditches. The buildings were old and set on wooden blocks. I first raised the house, put a cellar under it and graded up to it. A little later I planted a row of maples along the road in front of the yards. Following this I commenced ditching. I soon found something had to be done to bring up the fertility of the soil, or I never could pay my interest, as I was over $4,000 in debt.

I read an article on dairying, giving the value of stable manure, in addition to the constant income from the dairy. It was then I decided on my line of action. I slowly turned my stock into common grade cows. With Toledo for my market, I went to work making butter. I met trouble all along the line. My buildings were too old, and not adapted to dairying. When winter came all my cows went dry and my income was cut off. My customers complained, as they expected butter in winter just the same as in summer. I began growing beets to supply winter feed. I raised my barns and made warm stables, kept the cows and managed to have some butter in winter. I grew more beets and had more fresh cows in the fall, supplying a few private customers with butter during the winter.

My land was poor and I could not make much headway. I visited John Gould's farm and saw the first wooden silo in Ohio. I saw five or six other silos in that dairy district near Cleveland. I came home and in 1887 built three silos, holding about 240 tons. They were the first in this part of the State. After partially filling them, I increased my cows; in the meantime, I was saving and applying the manure to my land. I tilled the cornfields. It increased my crops, and consequently, I was able to add more cows to my herd. I never bought fertiliser or hay, and raised all my feed, excepting the bran middlings. I used about half a ton per cow. I increased my butter yield from 4,000 pounds in 1887 to 6,700 pounds in 1891. I built two more silos for summer feed, and commenced feeding silage the year round.

Making and Marketing the Butter.

I purchased two Jersey heifers and a registered Jersey bull. I soon found that I could keep three Jersey cows on the same feed that two of the common cows consumed, and make as much or more butter per cow. I got more Jerseys and made more butter. In 1896 I made 10,200 pounds; since that time I have averaged a little over 11,000 pounds butter per year. I had to hire all my help. I had only one boy and he went to school most of the time; he liked machinery better than farming. When he married and started out for himself, he managed a threshing machine and a sawmill. He likes that sort of work and is still at it.



A convenient building for Farm or Dairy.

I had to make my butter. My wife could not help, as she had all she could do to keep the house in order. At first, I churned by dog power in the basement, but later used horse power. In 1892, I built a creamery and purchased a three-horse power engine. I taught a young man to make butter and since that time I have not made much myself. The man I now have has made my butter nearly six years. The past two years, he has delivered the most of it to customers in Toledo. We are not able to supply our demand.

Our butter is put up in one-pound prints, and delivered once a week to private customers. We average a little over 210 pounds a week. In a four weeks' test it required 14⅞ pounds milk to produce a pound of butter. We aim to make as near that amount as we can. For four months, commencing May 1, I get 25 cents a pound, and for eight months 30 cents.

Building up the Herd.

From 1896 to 1899, inclusive, I made purchases of registered stock. Soon after that my cows commenced to abort, and one year I lost 18 calves. Since that time I have had more or less trouble with abortion. My young heifers have troubled me most. In 1905 I lost only two and hope to eliminate it entirely. I have not raised as many heifers from my herd as I would like, on this account. For a long time I raised 10 heifers a year. I have stuck to the Jerseys, because I saw demonstrated in the test at Chicago in 1893, just what my experience has proved for me. I have seen nothing since in any other breed that could beat them, taking feed into account. I have 42 cows and a few young cattle. I have several cows that, when fed on our common feed, give from 33 to 38 pounds milk per day, testing 6 per cent. butter fat.

I sold my bull, Brown Bessie's Boy, No. 59110. He was of a dark fawn colour and finely bred. I have some fine cows and heifers from him. I am now raising a young bull, bred largely from the St. Lambert stock. In my opinion, five or six years is as long as an ordinary dairyman should keep a bull. They get cross, and inbreeding is not satisfactory, at least, in my experience. I plan to use my bull on the best cows I can get. I am reasonably sure of some choice cows as the result of such breeding.

I let the calf remain with the cow the first three days. I then remove it and teach it to drink, and feed part new milk for two or three weeks, adding skimmed milk gradually for the whole feed. I continue the milk until the calf is six months old. I feed silage to the cows morning and evening, with a good supply of bran and middlings. Clover hay is given them at noon. I feed the heifers just the same as I do the cows, thus keeping them nice and plump. I breed heifers so as to have them freshen at two years old. I keep fall calves so as to have as many fall and winter cows as I can get.

I keep my cows in stable at night, as soon as frost comes, and feed them all the silage they will eat. I feed each cow in milk about five pounds bran and buckwheat middlings in equal parts per day. As soon as pasture is gone I commence feeding clover or alfalfa at noon. I give them what they will eat up clean. I keep water and rock salt where they can reach it the year round. This treatment is kept up until spring. The cows are let out only on warm, pleasant days, 1½ or two hours after the noon feed. When grass comes in the spring we let them out on the pasture two hours, after it dries off in the morning, and then return them to the yard until

4 o'clock, when they are allowed to go into the stable, where a ration of silage, bran, and middlings is in waiting.

Each cow has 3½ feet of floor space, with individual manger the same width. The cows are tied to a steel bale with rope around the neck attached to a sharp-end swivel. I have a cement floor. This is kept well bedded. Horse manure and other absorbent materials are scattered in gutter behind cows every day. This absorbs the liquid.

Methods of Handling Manure.

The manure is wheeled out and piled in the yard. This is spread directly on the fields when weather and ground will permit. My stable is kept as near 60 degrees as possible. Water pipes do not freeze. Have fed silage the year round since 1892. My feeder gives a half ration of silage about 5 o'clock in the morning. The cows are then milked. After breakfast he finishes feeding silage and grain. At 11 o'clock we feed what they will eat. At 4 o'clock, silage and grain. We have supper at 5 o'clock, after which the milking is done. The bull is fed about the same as the cows. We keep him in a large box stall, exercising him in the yard when the weather is fair. He is not kept quite as warm as the cows, and has no pasture.

I think farmers should keep pure-bred sires, and leave the business of producing registered stock to men who are able and like that work. Every well-regulated farm should have silage for all herds of stock, excepting work horses. Stock all like it, even poultry. Corn, saved in a good silo, in my experience, is worth a third more to feed than when saved in any other way, and costs less to harvest it.—*American Agriculturist.*

KING ISLAND MELILOT.

In the last issue of the *Journal* a paragraph appeared giving particulars of a new fodder grass, known as "King Island Melilot." Since then a further communication has been received from Mr. H. C. Macdougall, of King Island, by the Under Secretary. The letter, which explains itself, is as follows:—

"Lorne," King Island, 27-6-07.

The Under Secretary for Agriculture, Perth, West Australia,

"Dear Sir,—Under separate cover I am sending to you a small sample of King Island Melilot, as it is locally called; its botanical name is ***Melilotus Officinalis.***

"Mr. W. C. Macdougall (of Sydney) told me he had spoken to you about this grass, and so I follow on to give you a few particulars which may be of interest to you.

"While in Adelaide about two months ago, I gave a sample of this seed to the Secretary for Agriculture for South Australia; he somewhat distrusted it, because so many of the Melilotus family are rank weeds, but after

I told him what it had done and is still doing for King Island, he altered his opinion of it, and ordered 3 bags for trial purposes. After several years of experience we King Islanders are all of the one opinion that *Melilotus Officinalis* has made the poor sandy soil capable of turning off the primest beef and best butter sold in Tasmanian markets, and at the same time is so improving the quality of the soil that each year it gives a larger return. We have paddocks of lucerne growing well now, which, if it had not been for Melilot would never have been able to grow at all.

"This seed has been sown in raw white sand, and in the course of 5 or 6 years it has changed it into dark, almost black rich loam, and made it capable of running (for 5 months of the year, September to January) a beast to the acre.

"In growth it is similar to lucerne, but has a yellow flower ; when cut for hay, in the flower stage, it has a beautiful aroma, and horses, cattle, and sheep are very fond of it. Average hay crops are 3ft. to 4ft. high, from 30cwt. to 2 ton per acre. It also makes splendid ensilage, and yields about from 5 to 7 tons per acre of green stuff.

"It is a splendid fattening and dairying grass. About 75 per cent. of the feed on King Island is Melilot, and both our beef and butter always realise highest markets rates, which should be proof enough that it does not taint the product. There is a short period of about a month at the seed stage, when there is the slightest taint in butter, but this is so slight that only experts notice it, and it is not bad enough to affect the market price of it.

"We do not advocate this grass to be superior to all other grasses ; what we claim is that for poor sandy soils this is the grass to gradually improve that class of country and make it capable of carrying and fattening stock of all kinds.

"This Melilot is very fond of fire, in fact we burn off our paddocks every year, and this is undoubtedly one of the causes of the change in the character of the soil, the potash and the nitrogen which this legume puts into the ground evidently combine with other forces to produce this result. We sow from February to September, but early in preference, and as soon after a fire as possible. In new scrub country we fall the scrub about December and burn it off about March, and sow seed as soon after as possible on the burn; it starts to spring from March to May, according to seasons, and continues green right through to February, when it seeds, dries off, and is burnt again. We repeat this every year, except that only one sowing is necessary ; the yearly burns prevent the scrub and bracken ferns from growing, and gradually clear out all the weeds and rubbish. When sown on plowed land we harrow first and sow after, but don't harrow in, the rain and wind cover the seed quite enough. Ordinary sowing about 10lbs. to 20lbs. per acre. I would advise heavier sowing for first crop, it would give a better idea of what the grass was like, and the thicker the crop the better for both grazing and fertilizing. It being a heavy seeder, cattle and horse carry the seed and spread it in their manure. It is somewhat of an acquired taste, but cattle soon get used to it and like it very much. Dr. Cherry, Victorian Director of Agriculture, speaks very highly of this grass, and if it will only do for the millions of acres of sandy country in Australia what it has done for King Island it would be a good thing for us all. If the West Australian Department of Agriculture would care to try this seed in bulk

I shall be pleased to supply it at same rates as to wholesale houses : Transhipped from our local steamer to Melbourne boat, transhipping charges, B/L cartage, etc., paid by me at Launceston, 22s. 6d. per 100lbs. f.o.b. Launceston. Care should be taken to get only King Island seed, as we have only the one variety here, the *Melilotus Officinalis.* Thanking you in anticipation,

I remain, yours, etc.,
H. C. MACDOUGALL,"

THE PLANT A LIVING MACHINE.

The study of plant physiology has done much towards unravelling many of the so-called mysteries of plant life, and it is becoming recognised by all up-to-date agriculturists that the living plant is a highly complex machine—a machine that is supplied with energy from without for the proper working of the different parts that go to form its structure.

In 1901, the late Professor Marshall Ward in his book on *Disease in Plants* pointed out that in view of the enormous strides made in the study of the physiology of plants during the last quarter of a century, it was becoming recognised that attention should be " more concentrated on the living plant itself and on the physiological actions which make up its life." The living plant must be regarded as a sort of working machine—infinitely more complex than any machine made by man, but a machine nevertheless—the purpose of which is to store up energy from the sun, and so to add to our wealth on this planet, at the expense of the extra-terrestrial universe.

Dr. N. A. Cobb, formerly Director of the Division of Pathology and Physiology, Hawaiian Sugar Planters' Association, in a report on "Some Elements of Plant Pathology" states that careful study of healthy living plants must constitute no mean part of the work of any institution that attempts to deal rationally with plant diseases, and shows the importance of the subject of plant physiology by referring to what agriculture really is. He states the following :—

" In my opinion the term agriculture is not an altogether happy one. I fear the use of that word has done something towards the perpetuation of a serious error. The word points to the soil as if that were the principal element in the growth of crops. It means the cultivation of the field, while the fact is, it is the plants that are cultivated. The word agriculture is one that seems to indicate that the soil is the most important thing in the growth of crops. The plant is the most important thing. The soil is no more the main thing in agriculture than the bed of a river is its principal feature. The moving stream of water is the principal thing. It is the water that can furnish power and float ships ; it is the water that can vivify the desert. The field or the soil bears some such relation to the stream of living crops that flows through it year after year, as the bed of a river bears to the water streaming over it.

"This is by no means an altogether barren idea. Our progress in agriculture will bear some ratio to the firmness with which we lay hold of the idea that in the growing of crops, the plants are, after all, the main thing. If the plant is the main element in crop production, we must take the greatest pains to understand the plant. We must understand its anatomy, its physiology, and its pathology.

"Agriculture is the art of rearing healthy, vigorous plants, and so considered, may even be regarded as an application of the facts of plant physiology and pathology."

It should not be concluded, however, that the plant should receive the whole attention, for it is becoming recognised that the soil is a much more complex body than was suspected until comparatively recently. A scientific agriculturist has to consider the properties of soils in relation to solutions they yield to water in contact, the manner in which they retain some solutions and allow others to pass easily, and he must also acquaint himself with the physical properties of ordinary soils with respect to the phenomena of capillarity, absorption of heat, etc.—*Exchange.*

EXPERIMENTS IN GRASSES.

The Under Secretary for Agriculture (Mr. A. Despeissis) has received from Mr. Vernon Hamersley, of Toodyay, a report as to the results obtained from planting various kinds of grass seeds supplied to him by the department at the end of May, 1905. After giving details of the results in connection with the planting of the different seeds, Mr. Hamersley sets forth his conclusions as follows:—

"The results of trials are very conflicting taken over a number of years, and success or failure is often subject to the summer rains. If we are fortunate in getting a good January rain the success of a plantation is almost certain if the land has been well tilled to take full advantage of the downpour. But, granted a successful establishment of either paspalum or lucerne (and these, I think, are the best) during the first year, during the succeeding couple of years the greater portion of our ground sets so abominally hard that the plants are unable to continue a growth through the summer that warrants our giving them the attention necessary to establish them on a very extensive scale, except in picked localities or by some new method of treatment not yet discovered by us. Holding the above view of the matter, I next turned my attentin to another phase of the question. Our stock mainly rely during the year upon annual grasses rather than perennial. I have for some years held the opinion that the grass holding the greatest sway throughout these districts, the silver grass is one of the worst grasses known. I have a pronounced dislike for it, and I think we would be wise to plant annuals largely to replace it. The Cape weed, or dandelion, is one of the best of our fodders. The lettuce dandelion is another, as also are our native geranium and everlastings. Of imported annuals I am very keen on Italian rye-grass. Unlike silver grass, it grows rapidly with the first rain, with a good sward, and it continues its growth much later into the warm weather than the silver grass; and when either green or dry it is relished by all classes of stock. It seeds profusely and gives no trouble when in seed. On account of the avidity with which the stock eat it down it is hard to establish, unless judiciously stocked. My objection to silver grass is that it is too slow a grower after the first rains. It does not grow a sward of grass, but is like the hair on a cat's back. It is very susceptible to cold and wet, and is wiry and tough. When it seeds it is most troublesome. Stock will eat all other grasses in preference to it, and thereby convey to us their dislike of it. I am satisfied that there are great possibilities ahead of us in planting largely several of the annual grasses and clovers. . . . . I feel sure that over hill and dale a greater success awaits those who give greater attention to good, hardy annuals than to endeavouring to obtain a fodder that will continue to grow throughout our long dry season without a reasonable chance of several thunderstorms."

Referring to Mr. Hamersley's report, Mr. Despeissis yesterday said that it opened up a new field for an interesting discussion, and he hoped that the people on the land would make known their views on the matter. Judging from the analogy it was certainly reasonble to think that some hardy and free-seeding winter annuals would germinate with the first rain, and the growth in the winter and spring months would be infallible. Several examples of such grasses had already made their appearance in the country, and were worthy of attention. These included the canary grass and some of the barley grasses. Amongst clovers they had even a wider selection, as not only were most of them hardy, but they also seeded freely. Whether in the succulent stage or dry, they were rushed by stock. Stock would fatten on the dry leaves and stalks and also the seeds.

SHEEP AND LAMBS.

The following interesting letter has been published by the "Southern Times" from Mr. W. V. Brown, of Mount Kokeby :—"I noticed a report of a paper read before the Northam Agricultural Society, by Mr. George Throssell, on the value of sheep and lamb fattening, etc., in New Zealand. This being a subject on which I had previously written, I will esteem it a favour if you will give me space for further suggestions and experiences. Being convinced that wheat and chaff could be made to return far better prices than those ruling early this year, I started feeding in March last about 70 mixed sheep; included in these were 30 cull ewes, bought at 8s. per head. When prime I killed and sold at 6d. per lb. averaging 47lbs., netting me a clear profit of 14s. per head, allowing market rates for feed. Lambs and wethers also fattened, but not so quickly as the culls. These consumed on an average one and a-half bushels of wheat and 56lbs. chaff, some eating as much as 2½lbs. of wheat a day, besides chaff. I began with dry wheat with chaff, but found some sickening, and the wheat not all digested, so I started giving malted wheat. This was readily eaten and digested. I feel sure cull ewes (if sound and healthy) will give better results pound for pound of wheat consumed, than a pig, which is reasonable owing to digestion being more complete. Six weeks are sufficient to make prime meat. Success is certain if the conditions are favourable, viz., ample feeding space and water and system. Our possibilities are great if we adopt similar lines to the New Zealander, viz., to aim at providing such fodder as our climate and land is capable of growing, and feed the bulk to sheep. For instance, 100 acres of wheat or oats cut for hay (averaging 30 to 35cwt.) chaffed and fed to sheep (with plenty of water available) would keep 600 for 365 days. Grain and hay we can grow of the best, so this should be the main feed. Therefore, June lambs, small paddocks, cultivation, fertilising, rape, barley, and oats for green winter and spring fodder, besides fertilising pasture land and introducing nitrogen storing plants, as suggested by Mr. Harper, will about fill the bill, and be the stepping stone to successful dairying, by getting our soils into that mechanical and organic condition so necessary to be able to fill the silo. Those farmers adjacent to the Coolgardie water-pipe track have a decided pull for watering their stock, but irrigation for fodder with water at over 6d. per 1,000 gallons is not a business proposition. Finally, I must venture the opinion that sheep are wanted first to pave the way for the cow. The Minister for Agriculture will do well to consider this."

FARM NOTES FOR SEPTEMBER.

By Percy G Wicken.

The returns published in last month's issue of the *Journal,* with regard to the quantity of fertiliser imported into the State, furnish interesting reading, and when we compare the quantity of fertiliser imported, viz., 371,000 cwt. with the total area under crop in the State, viz., 461,000 acres, and adding the quantity of guano and bone-dust produced locally we find that the average quantity of fertiliser used in this State is, approximately, 100lbs. per acre.

This shows that our farmers are thoroughly alive to the advantages to be gained from the application of fertiliser to the soil. In South Australia it is estimated that only about 60 per cent. of the cereal crop is fertilised, perhaps about the same percentage would apply here, but the average is made up by the much heavier dressing used by orchardists, potato growers, and gardeners, who, owing to the small quantity of farmyard manure available, use large quantities of commercial fertilisers.

Looking at the matter from another point of view, according to the Customs return, the value of the fertilisers imported into the State during the year amounted to £63,783, without allowing anything for charges, cost of handling, profits for vendors, or taking into consideration the local production, this works out at 2s. 9d. per acre for every acre under cultivation, and if we take the local production into consideration the cost will amount to, approximately, 4s. per acre, or a total expenditure by the farmers of this State of £90,000 per annum for the purchase of fertilisers.

These figures show that the benefit of fertilising their crops has been kept well before the farmers of this State, and that they have not been slow to adopt the teaching.

The use of fertilisers has increased every year, and this fact alone is evidence that their use has been found profitable.

The business of raising lambs for local use, and later on for export, is one which should receive the attention of all settlers who have facilities at hand to enable them to embark in this industry, which, I have no hesitation in saying, is one of the most profitable lines any landowner can invest in.

The results obtained by some of our well known breeders show that in the matter of lamb production this State should not have to fear competition from any other country. The local conditions of a mild climate, certain rainfall, and, as a result of the rain, a certain supply of feed for the ewes and lambs at the time that they most require it, and our nearness to the London market, are all conditions in our favour; and, later on, when we have sufficient quantities to send away to enable us to guarantee full cargoes to ships taking them away, we shall no doubt be able to secure lower freights than the Eastern States.

Although this year the rain was somewhat late in coming, first-class lambs were sent down to Perth in July, and realised high prices. Messrs. Marwick Bros., of York, sent down lambs to market in the middle of July which turned the scale at 24 and 25lbs., and what one farmer can do there is no reason why others cannot do as well.

Considerable attention has been paid to the question of growing grasses and fodder plants for the purpose of providing a more abundant supply of feed for the sheep than is afforded by the native grasses, and every year larger areas of land are being planted with rape for this purpose. Rape, together with barley and tares, oats and peas, and the surplus growth from the cereal crops afford the best of winter feeds, but to keep up the supply of feed throughout the year and thereby increase the carrying capacity of the farm, it will be necessary to devote attention to the planting of deep-rooted grasses and fodder plants, such as African Wonder Grass, Rhodes Grass, Paspalum Dilatatum, Cow Peas, and Lucerne, and also to go in for making ensilage, so that at any time of the year when there is a surplus supply of feed it can be conserved until such time as it is required. There is no reason for any expensive structures to be erected for this purpose, but a stack can be built on the same principle as a hay stack in any part of the farm where the surplus feed is available, and if the stack is well packed, and a weight put on top, a good sample of silage can be turned out with only a small quantity of waste round the sides, and it will make a good feed for the sheep at a time when other feed is scarce.

The writer will at all times be pleased to hear of instances in which lambs have attained to heavy weights at an early age, and breeders are invited to send in accounts of their experiences, as these enable us to compare the results obtained in this State with those obtained elsewhere, and supply us with useful information for intending breeders.

In addition to a plentiful supply of green feed, it is necessary to keep the sheep in a healthy condition; that they be supplied with a quantity of salt, and where this is deficient in the pasture it must be supplied artificially. Salt is more or less poisonous to worms and flukes, and it is, therefore, necessary to give the sheep a plentiful supply. The effect of a deficient supply of salt is to cause debility in the sheep, so that they cannot resist the attacks of the parasites, and these always thrive in a weak animal. Salt alone is not sufficient in inferior pastures, sulphate of iron (copperas) should also be given with the salt, it acts as a tonic, and is good for intestinal worms. The sulphate of iron should be powdered up fine, and mixed up with the salt at the rate of one pound of sulphate of iron to 10 pounds of the salt, and when the mixture is put out for the sheep it should be placed under a roof so that it is protected from rain.

If not already planted, deep-rooted grasses should be planted out as early as possible, but at this time of the year better results are likely to be obtained from the planting of roots or cuttings than from the planting of seed, as the roots are more likely to establish themselves before the weather becomes too dry. Roots of such grasses as Paspalum Dilatatum, Rhodes Grass, and African Wonder Grass can now be purchased from most of the seedsmen, and can, in many instances, be obtained from neighbouring settlers.

Most of those engaged in stock-raising are continually on the look-out for any new fodders that are likely to give better results than those already being grown, and anyone inclined to do a little experimenting should obtain a packet of "King Island Mellitot," or "Pea Clover," which is being highly spoken of as a most prolific fodder plant. It is of the same class as the Bokhara Clover, but has a yellow flower; and being of the leguminous order, in addition to its value as a fodder, it has the property of obtaining its supply of nitrogen from the air, and as the plant decays this nitrogen is returned to the soil, and its fertility is thus increased. The Department has obtained a quantity of seed for planting on the State farms, and it would be worth any settler's while to try a small quantity. The seed can be obtained from seedsmen in Perth.

Root croops, such as mangels, sugar beets, and Jerusalem artichokes should be sown this month if they have not already been planted. For these crops the ground should be deeply ploughed and well manured, and the seed should be sown in drills, so that the soil between the rows can be kept well stirred and free from weeds.

Maize is one of the most valuable crops that can be grown during the summer months, and although in our Eastern Districts it will not pay to grow for grain, if sown early in fallow ground, good crops of green fodder may be obtained from it; if not required while green, it can be made into hay and stacked away until required.

Pumpkins and squashes, both for table purposes and for stock feed, are a crop that should receive more attention from farmers, and the attached notes on their cultivation may prove of interest.

THE CULTIVATION OF PUMPKINS AND SQUASHES.

Several inquiries have been made of this Department as to the best method of cultivating pumpkins on a large scale for market purposes, I will endeavour, in a few accompanying notes, to explain the methods adopted by which the cultivation of pumpkins and melons is carried out on a large scale, and, even at the comparatively low prices obtained, are a profitable crop to the farmer. Pumpkins are also a very valuable article of fodder on the farm, and especially to those engaged in dairying. They are easy to harvest, will keep for a considerable time, and can be stored at very little expense, and used as required.

Soil and Climate.—Pumpkins can be grown in any of our semi-tropical and temperate climates, and will thrive almost equally well on the sea coasts as on the mountain ranges farther inland, provided the rainfall is sufficient to enable the plants to make a start with their root growth before the weather becomes too hot. I have seen them growing to equal perfection in the warm districts of the Riverina, on the mountain ranges 4,000 feet above sea level, and also on the sandy flats along the sea coast. Although the plants do well on most soils, the best results are obtained on a good, deep, well-drained, friable, loamy soil, which, when well worked, retains the moisture during the summer months, and also enables the roots to penetrate well down into the subsoil, and thereby to withstand the effects of the dry weather during the hot summer months.

Method of Cultivation.—Pumpkins being a crop that make all their growth during the hottest time of the year, and owing to its habit of growth, the vines trailing along the ground for long distances, they are exposed to the full force of the sun's heat. The amount of water evaporated from the large leaves and moist stems of this plant is very great, and as this supply of water has to be obtained by the roots from the soil, it follows that deep cultivation is necessary. This can be best performed by subsoiling the ground in the autumn previous to sowing the crop, and can be either carried out by a special subsoil plough, or by using two ordinary ploughs, following one another with the mould board removed from the second plough; the first plough will turn a furrow seven or eight inches deep, the second plough following breaks up the ground in the same furrow to a further depth of eight inches. This operation makes a deep bed of well worked soil, which is able to hold a large quantity of moisture, and so long as the surface is kept constantly stirred, very little evaporation will take place; the well worked surface soil acting in the same way as a mulch, and by destroying the capillary action of the surface soil prevents the evaporation of the moisture. After the ploughing is completed, the land requires to be harrowed, and rolled or disced, until it is worked up to a fine tilth.

The land is now ready for the drill-plough, and drills are marked out across the paddock in both directions, at a distance of from 10 to 14 feet apart, according to the quality of the soil and the habit of growth of the variety of pumpkins that are to be sown. The richer the soil the farther the plants require to be apart ; as the plants grow stronger they throw out more vines ; the poorer the soil the closer the plants may be together.

We now have the paddock marked in small squares, say 12 feet each way. It is then ready for making the "holes" or "hills," as they are called, and this is performed by means of a prong-hoe, at the intersection of each drill, the soil is worked up by the prong-hoe to a depth of about eighteen inches and made into the form of a hill, and all lumps broken up, couch grass, etc., removed; a good sized handful of manure (superphosphate is preferable) worked in, and the hill levelled off so as to come about one inch above the level of the ground, and to be not less than four feet in diameter. This operation is very similar to making a hole for planting a tree. At a distance of 12 feet apart each way this will give about 320 hills per acre.

In many instances where the expense of subsoiling the whole of the ground cannot be incurred, a method is adopted of subsoiling a strip six feet wide where the "hills" are to be worked, and leaving the balance undone. This is not a good system, as the succeeding crop, which also derives a great benefit from the subsoiling, will become very patchy and uneven, growing well on the subsoiled part and not so well on the other part. Also the saving effected is very small, as while the subsoiler is at work on the block of land the subsoiling can be done cheaper at one operation than if the other part has to be finished afterwards.

Sowing Seeds.—About five seeds are sufficient to sow in each hill, and they should be sown a few inches from the edge of the hill and at an equal distance apart. The best way to plant them at an equal depth is to drop the five seeds on the ground in the position required, then press them in with the thumb to the depth of the first joint, by this means an even depth of planting is obtained, and the operation only takes a few seconds. A large area of land can be sown in one day by one man.

After Cultivation.—After the seed is sown the harrows require to be run over the ground between the hills several times to keep the weeds in check, and as soon as the vines show signs of commencing to run, the land between the rows should be ploughed up by a single-horse plough, throwing a furrow on each side as near to the "hills" as possible without burying the young plants, and finishing off in the centre between the rows, the harrows are then run over the ploughed ground and no more cultivation is necessary until the crop is harvested. The vines grow very rapidly after this stage is reached, and in a very short time the whole of the area is covered with a thick growth.

Most of the early flowers that appear on the vines are of the male variety, and bear no fruit ; the female flowers come slightly later, and, being fertilised, wither and drop off, leaving the small bulb which forms into the pumpkin, in exactly the same manner as the blossoms drop from a fruit tree leaving the minute fruit behind. The pumpkin beetle attacks the leaves of this plant in the early stages of growth, and these can be kept in check by spraying the leaves with a mixture of Paris Green, mixed in the proportion of 1lb. to 160 gallons of water. This requires tobe kept well stirred while spraying.

A method often adopted by farmers who go in extensively for pumpkin raising is to grow the crop in conjunction with a crop of maize. Five or six rows of maize are sown and then two rows are missed, and in this space a row of pumpkin "hills" are made, the tall maize stalks shield the pumpkins from the sun, and some excellent results are sometimes obtained. This system requires good soil that contains plenty of moisture, but where the soil is anyway dry the crop of pumpkins will have all they can do to obtain sufficient moisture, and they will require the whole use of the ground.

Varieties.—There are a large number of varieties of pumpkins and squashes, and although they are known under the different names, it is hard to say where the difference between the pumpkin and squash comes in. The term squash in the first instance was used to signify the softer varieties, such as the vegetable marrows, but now many of the varieties called squashes are as hard as the hardest ironbark pumpkins. Some of the pumpkins are quite soft. The two terms may be taken as synonymous.

There are both bush and running varieties ; the best of the bush and close-growing varieties are the delicata, white and yellow bush squash, pineapple squash, and summer crookneck. The best eating varieties among the strong-growing varieties are the ironbark, Hubbard, Turk's head, crown, button, and Warren squash.

The large varieties grown, mostly for cattle feed, are the large grey cattle, large red cattle, French pot-iron, hundredweight, mammoth Chili, French striped, and others.

Another variety which is grown in this State, is the gramma, or rio, also known as the bugle or trombone pumpkin. This is a sort of general purpose pumpkin. It can be used either for food for stock, or as a vegetable. It is excellent boiled or baked. It is thefavourite sort for making pumpkin pies. Flavoured with either pineapple, lemon, or ginger, it makes a very rich jam. It will keep if stored in a dry place all the winter, and is always valuable as a stand-by when other vegetables are scarce. This variety can be sown later than most of the other varieties, and will stand more dry weather.

Some varieties will do better in one district than another, and this can only be found out by growing several varieties, and then keeping to the one that proves most successful. Although I have mentioned a number of varieties of pumpkins, when grown for market purposes or for raising for seed, no two varieties should be planted in close proximity to one another, as they are plants that will very readily cross-fertilise; and although this may not appear to disadvantage in the first crop, the seed saved from this crop will produce all sorts of cross-bred varieties. If only grown for food for stock, this does not much matter, but if for market or seed purposes, it greatly deteriorates the value. In the United States of America whole district grow only one variety of pumpkin, and the varieties are thereby kept pure.

Harvesting.—One of the advantages to be derived from this crop, especially where labour is scarce, is the easy manner in which the crop is harvested, and forwarded to market. No expensive machinery is required, no reapers and binders, stripers, or threshing machines, etc. All that requires to be done is to drive a wagon through the paddock, load up the crop, and cart to the railway station and place in the trucks. This alone should prove a great consideration where a quick return at little outlay is required. Should the price be low at time of harvesting, they can be left on the ground for a considerable time, or carted to the sheds and stored until required for sale or home use. In forwarding to market it is much more profitable to grade the pumpkins into sizes and varieties before sending for sale. A nice truck of even-sized pumpkins, whether of a large or small size, will fetch a better price than a truck which contains a mixture of all sizes and varieties, and will probably lead to inquiries for a further supply of the same sort.

GOVERNMENT LABOUR BUREAU.

JULY REPORT.

The following is the report of the Superintendent of the Government Labour Bureau for the work of the Labour Bureau for the month of July:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 742. Of this number 398 were new registrations and 344 renewals, *i.e.,* men who called who had been registered during the year prior to the month of July. The trades or occupations of the 742 applicants were as follows :—Labourers 223, handymen 76, farm hands 66, handy lads 50, carpenters 34, bushmen 32, cooks 24, miners 23, drivers 15, gardeners 15, engine-drivers 11, hotel hands 11, blacksmiths 10, painters 10, dairymen, navvies, plate-layers, and teamsters 8 of each, clerks, firemen, station hands, and grooms, 6 of each, caretakers, fitters, and yardmen, 5 of each, market gardeners, plasterers, and plumbers, 4 of each, bakers, bricklayers engineers, printers, orderlies, survey hands, and waiters, 3 of each, and 38 miscellaneous.

Engagements.—The engagements for the month totalled 153. The classification was as follows :—Bushmen 25, handymen 17, farm hands 16, handy boys 16, labourers 16, boys for farms 12, woodcutters 10, carpenters 5, dairymen 5, scullerymen 4, cooks, kitchenmen, and orchardists, 3 of each, market gardeners 2, survey hands 2, and 14 miscellaneous.

Kalgoorlie.

Registrations.—The registrations were 34 and the renewals 35 ; total 69. The classification was as follows:—Labourers 23, handymen 17, canvassers 7, handy youths 5, cooks 3, blacksmiths, barmen, carpenters, and engine-drivers, 2 of each, butchers, boilermakers, clerks, and fitters, 1 of each.

Engagements.—The engagements numbered 7, viz., labourers 2, butchers, cooks, engine-drivers, handymen, and handy youths, 1 of each.

The female servants who called numbered 31. There were 14 new registrations and 17 renewals. The classification was as follows :—Generals 7, cooks 5, waitresses 4, light generals 4, laundresses 3, housemaids 3, housekeepers 2, charwomen 2, and barmaid 1.

There were no engagements.

Northam.

Registrations.—There were 17 applicants for work, classified as follows :—Farm hands 6, labourers, handymen, and chaffcutter hands, 2 of each, teamster, yardman, contractor, clearer, and cook-general, 1 of each.

Engagements.—The engagements for the month numbered 7, viz., chaffcutter hands 3, farm hands 2, clearers and cooks, 1 of each.

Women's Branch, Perth.

Registrations.—The new registrations for the month were 90 and the renewals 80. The classification was as follows:—Generals 40, housemaids 27, laundress-charwomen 26, cooks 21, housekeepers 12, light generals 11, nursemaids 8, waitresses 8, useful girls 7, lady-helps 3, married couples 2, cook-laundresses 2, nursery-housemaids, pantrymaids, and governesses, 1 of each.

Engagements.—There were 60 engagements, classified as follows :—Laundress-charwomen 24, generals 16, light generals 6, useful girls 4, nursemaids 3, housemaids 2, lady-helps 2, cook-laundresses, laundry-housemaids, and nursery-housemaids, 1 of each.

General Remarks.

The number of individual men who called at the central office, Perth, during the month was 742. This total is 139 in excess of that for June, and 134 in excess of the number for July last year. The engagements were 153, being 19 short of that for June and 13 in excess of the total for July last year. During the month there were 37 men assisted by railway passes to employment from the central office, Perth. The fares refunded totalled £19 14s. 8d., and the sum of £10 4s. 3d. was received from employers to send men, £4 14s. 4d. to send women, the whole amounting to £34 13s. 3d. At Kalgoorlie branch 6 men were assisted by passes. The amount refunded was 9s. 9d.

At the women's branch, Perth, 170 women called during the month. As compared with the previous month the number is 16 more, and 29 less than that for July last year. The engagements were 60, as against 45 for the previous month, and 60 for July last year.

The applicants for work at Kalgoorlie branch numbered 100 (69 men and 31 women), and at Northam branch 17 men. The engagements at Kalgoorlie were 7, and at Northam 7.

VALUE OF BLACKBOY.

By E. A. Mann.

In the July number of the *Journal* I note a report on Blackboy received from Dr. Voelcker in England.

As the report at first sight appears to contradict some of the statements made in my report as published in your *Journal*, Vol. XIV., p. 162, I should be glad if you would publish the following comments :—

1. The difference existing between Dr. Voelcker's analytical figures and my own is more apparent than real, and, as clearly stated by that gentleman, is entirely due to the varying proportions of moisture found. In the drier sample I found total sugars amounting to 26 per cent., while in the moist sample examined by Dr. Voelcker they amounted to about 12 per cent. This is quite consistent with the fact that my analysis was made on a partially dried sample—but does not, in my opinion, affect the commercial value of the analysis to any material extent. The different results due to different pro-

portions of moisture are clearly shown in my report, and those reading it carefully could not have been misled.

2. The discouragement cast upon the idea of preparing alcohol from material containing only 12 per cent. of sugar (to adopt Dr. Voelcker's own figures) seems scarcely justified when it is compared with the sugar contents of beet and sugar cane.

3. There is nothing to show at what time of year Dr. Voelcker's sample was cut. This is very important.

4. There is no difficulty as alleged in obtaining a pure spirit. The specimens obtained by ordinary methods in the course of my experiments were exhibited at the recent Exhibition of Manufactures held in Perth, and were admirable samples of pure spirit, quite fit for all export purposes.

5. Nothing is said about the second most important by-product—the fibre—and its use for paper-making, etc. The other points referred to were not considered very important by me.

Altogether the report is much more pessimistic than the facts would appear to justify. The best proof of this is the fact that as the result of independent tests which were made, a considerable amount of capital has been found willing to deal with the Black-Boy on a commercial scale, and steps are now being taken to open up this new industry.

FRANCO-BRITISH EXHIBITION.

This exhibition, which is to be held in London next May, is attracting a considerable amount of attention, and it is hoped that one of the finest collections of colonial produce yet seen will be displayed at this exhibition.

The exhibitors are to be confined to France, England and the Colonies. The Government of this State have decided to join with the Governments of the other Australian States in erecting a building to contain 50,000 feet of floor space for the purpose of making a display of Australian products, the building will be paid for and the space allotted on a *per capita* basis, and the space allotted to Western Australia is 4,000 square feet.

A board consisting of some of the heads of Government Departments has been appointed to arrange an exhibit from this State. Mr. P. Wicken, who has done most of the exhibition work in this State for some years past, has been appointed Secretary, and the work of collecting the exhibits is being taken in hand.

The exhibits will consist of collections representating the mining, agricultural, timber, and fishing industries, work from the State schools and Technical schools, exhibits from the manufacturers in the State, photographs, native weapons and curios, specimens of the flora and fauna of the State, and any other exhibits that can be obtained.

The various agricultural societies in the State have been asked to assist in obtaining exhibits from their respective districts, and the principal producers of wine, flour, and wool have been asked to prepare exhibits.

As we shall have to compete against all the other States at this exhibition, it is particularly desirable that as good a collection as possible be got together, and the Secretary invites all those who have anything worth showing which they can either loan, or sell, for this purpose, to communicate with him, and would also be pleased to receive any ideas or suggestions to improve the exhibit.

CURCULIO BEETLE.

In the January issue of the *Journal* of this year it was stated:—"Fruit-growers had been suffering from the ravages of a Curculio beetle (*Otiorhynchus cribricollis*). This is a small wingless beetle that crawls up the trunk of the trees, eating the bark and buds of young shoots. In a report received from Mr. Geo. Wickens, the Orchard Inspector for the Blackwood District, he states that his attention had been called to the presence of the beetles in an orchard. Poultry are allowed the run of the orchard, and are preventing the pests from spreading. Around all the trees when the soil had been kept loose by cultivation, the fowls had searched most diligently, and scarcely a beetle could be found. Where the ground had not been worked, scratching was a difficult matter, and the poultry had not succeeded in finding the beetles. I have advised hoeing around the remainder of the trees, and also suggested that some food be scattered at the foot of each infected tree to induce the poultry to scratch. The trees are a fair age, and no damage will result if a few of the surface roots are exposed. I watched the fowls at work, and noiced that they devoured the beetles greedily. The beetles remain only an inch or two below the surface during the day, can neither fly nor hop, and when infesting an orchard spread slowly from tree to tree. Thus their habits render them an easy prey to poultry, and from the result obtaining in the above orchard, I believe the pests can be kept in check this way." In a report just received from Mr. Wickens, he states that a good check for this pest was carried out by Mr. Hester, who during last summer tacked bands of sheep-skins about three inches in width, woolly side out, around the trunks of the infected trees, and since then no damage has been done by the beetle. A very large number were found dead in the wool, having become entangled while trying to crawl over it. The bands are attached by two small nails to the trunk of the trees. In cases where props are used for heavily laden branches, they are protected in the same manner.

LOCAL MARKET REPORT.

Market Report of the W.A. General Produce Company, for the month ending Wednesday, 7th August 1907:—Business during the past month fairly active; supplies still irregular owing to the very wet weather experienced of late. Values on the whole steady and gradually improving. Of the produce, detail particulars as follows: Bacon supplies still scarce, values high, with expectation to ease shortly. Butter, increased supplies all round at sources of supply, and values easing from day to day. Cheese continues very scarce, both on spot and at sources of supply; values ruling just now considered very high. Eggs of local origin very plentiful, with corresponding fall in their value. Potatoes: Tasmanian advices by cable this day show a material fall in values there, and now quoted at ruinous prices to growers, viz., 34s. per ton bagged and delivered free on board vessel at port in Tasmania, in consequence values on spot will be materially affected. Onions rather scarce on spot for the present, and values a little excited. Chaff continues good, supplies arriving in spite of the wet weather, and values do not seem to pick up, and selling cheaply. Millers' lines continue steady. Fuit, fairly good supplies; values good, especially for prime apples. Vegetables, increased supplies, and values still remain good. Poultry rather scarce of good quality, very good values obtained. Carcase pork of medium weight sells well.

Farm and Dairy Produce.—Bacon, best quality, 9¾d. to 10d.; good, 9d. to 9½d. lb. Hams, best quality, 1s. 1½d. Butter, best Victorian 1s. 2d., choice Queensland, 1s. 1d.; good N.S.W. 11d. to 1s. lb. Lard in lb. packets, 8d. lb. Cheese, medium, 8¾d.; loaf size, 9d. Eggs, country lots, 1s. 3d. to 1s. 4½d. per dozen. Potatoes, Tasmanian, £4 to £5 per ton; country lots (local) from £5 to £7 10s. per ton. Onions, 6s. 6d. per cwt. Chaff, from £2 12s. 6d. to £3 17s. 6d. per ton. Bran and pollard, from £6 to £6 10s. per ton. Flour, local sacks, £8 10s.; quartan, £8 15s. Oats, Algerians, 3s.; Whites, 3s. 3d. to 3s. 5d. bushel. Maize, Whole, 4s. 6d. bushel. Wheat, from 3s. 8d. to 4s. bushel. Oil Cake, £8 10s. per ton.

Fruit.—Naval oranges, from 6s. to 11s. 6d. per case; ordinary, 3s. 9d. to 5s. 6d. per case. Lemons, from 3s. 6d. to 7s. per case. Mandarines, from 5s. to 16s. 6d. per case. Cape Gooseberries, 4½d. per lb. Apples, Yates', 10s. to 13s. 6d. per case; Rookwood, 6s. 6d. to 10s.; Stermer's, 6s. to 9s. 6d.; Dunn's Seedlings, 8s. 6d. to 11s.; Rome Beauties, 9s. 6d. to 14s.; Nickajacks, 8s. 9d. to 11s. 6d. per case; other varieties from 6s. to 8s. case.

Vegetables.—Cabbage, from 5s. 6d. to 13s. 6d. per cwt. Cauliflower, from 3s. to 9s. 6d. per dozen. Carrots, from 6d. to 1s. per dozen bunches. Parsnips, from 9d. to 1s. 6d. per dozen bunches. Turnips, white, from 6d. to 8d. per dozen bunches. Turnips, Swedes, from 1s. to 1s. 6d. per dozen bunches. Turnips, Swedes, bulk, 7s. 6d. per cwt. Beans, French, 4d. to 5d. lb. Peas, green, 5d. to 5½d. lb. Marrows, 2s. to 3s. 6d. per doz. Pumpkins, from 5s. to 9s. 6d. per cwt. Rhubarb, from 1d. to 2½d. per lb.

Salads and Herbs.—Lettuce, from 1s. to 1s. 9d. per quarter bag. Spring Onions, from 3d. to 6d. per bundle. Beetroot, from 6d. to 1s. 3d. per dozen bunches. Celery, from 6d. to 2s. 9d. per dozen heads. Cress, from 9d. to

1s. per bundle. Radishes, from 4d. to 6d. per dozen bunches. Herbs, 2s. per tray. Mint and Parsley, 3d. per bundle.

Poultry (for killing).—Fowls, prime killing, 5s. 6d. to 7s. per pair. Fowls, good killing, 4s. to 4s. 9d. per pair. Chickens, 3s. 6d. to 4s. per pair. Ducks, 6s. to 8s. per pair. Geese, worth 8s. 6d. to 10s. per pair. Turkeys, gobblers, 16s. to 22s. 6d. per pair. Turkeys, hens, 9s. 6d. to 12s. per pair.

Carcase Meat.—Pork of medium weight, 5d. to 6½d. lb.

Sundries.—Corn sacks, second-hand, 5s. 6d. per dozen. Bran bags, second-hand, 3s. 6d. per dozen. Bonedust, £7 10s. per ton. Phosphate, £4 10s. to £5. Guano, £4 10s. to £5 10s. Ammonia, 20s. per cwt. Nitrate of Potash, 17s. per cwt.

NOTES ON THE CLIMATE FOR THE MONTH OF JULY, 1907.

This month has been unusually stormy in S.W. districts, where strong westerly gales, high seas, and heavy rain-squalls have been of frequent occurrence. The total rainfall at the Observatory for the month was 10.68 inches. This is nearly double the average, and is the greatest quantity ever recorded in Perth for July, though it has been exceeded three times in June, and once in May. The excessive rain extended Eastward to the Goldfields, but not to their N.E. limits, where the total for the month was below the average for previous years. From North-West Cape northward, and also in S.E. districts it was fairly normal.

Pressure was very low throughout the month, especially in the S.W. portion of the State. At Perth, for instance, the mean reading of the barometer was 29.996, which is 0.148 below the average for previous years, and is considerably lower than any former record.

Temperature was, on the whole, above normal. There were a few frosts in the early part of the month, and the temperature on the surface of the ground fell as low as 22deg. on the 3rd at Walebing. The following table shows the mean of the daily readings of a minimum thermometer placed on the earth's surface, together with the lowest readings for the month, at a few selected stations :—

Station.	Mean.	Lowest.	Date.	Station.	Mean.	Lowest.	Date.
Peak Hill ..	43·4	33·7	27	Perth Observatory	46·5	32·9	2
Cue	40·5	33·5	23	Wandering ...	37·1	23·0	9
Coolgardie ...	38·0	27·0	10	Bridgetown ...	38·6	28·9	10
Southern Cross ...	36·0	24·0	3	Karridale ...	44·0	34·0	10
Walebing ...	35·7	22·0	3	Katanning ...	37·9	27·0	10
York	41·7	30·0	3	Mt. Barker ...	40·1	30·0	1

W. E. COOKE,
Government Astronomer.

The Observatory,
Perth, August 7th, 1907.

The Climate of Western Australia during July, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						July, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan 1.
NORTH-WEST AND NORTH COAST:	Wyndham	29·980	30·028	30·134	29·824	87·0	68·9	78·0	94·0	61·8	85 4	65·8	94·8	50·0	21	2	1,891
	Derby	29·992	30·030	30·175	29·857	85·2	58·7	73·0	89·4	49·6	85·2	58·9	94·0	42·0	56	1	2,394
	Broome	29·996	30·032	30·141	29·834	82·6	59·8	71·2	90·6	50 4	81·5	58·4	92·5	40·2	85	1	2,296
	Condon	30·032	30·082	30·234	29·865	77 8	54·2	66·0	84·5	45·0	76·3	50·7	88·8	38·0	118	3	1,011
	Cossack	30·035	30·090	30·240	29·840	78·0	59·0	68·5	84·0	54·0	75·1	54·9	90·2	48·7	31	2	1,028
	Onslow	30·040	30·084	30·232	29·878	75·2	54·1	64·6	82·6	45·5	75 8	52·2	88·7	40·0	98	3	874
	Winning Pool ...	30·044	...	30·261	29·822	74·5	50·0	62·2	86·0	41·8	...	...	..	...	199	4	1,168
	Carnarvon	30·079	30·128	30·307	29·819	70 2	53·1	61·6	75·5	45·6	71·3	49·9	81·7	40·5	255	5	1,083
	Hamelin Pool... ...	30·056	30·133	30·288	29·734	69·0	49·0	59·0	70·2	40·4	68·5	47·8	77·2	35·6	264	9	786
	Geraldton	30·060	30·150	30·333	29·624	68·4	54·0	61·0	73·2	45·4	68·3	49·8	81·0	34·9	808	17	1,926
INLAND:	Hall's Creek	30·045	30·102	30·202	29·834	83·3	49·5	66·4	89·2	37·8	78·3	47·9	93·0	35·0	*Nil*	...	1,747
	Marble Bar	...	...	...	...	79·8	54·0	66·9	88·5	44·0	78·8	52·6	89·6	38·0	39	2	884
	Nullagine	30·056	30·127	30·288	29·734	75·8	49·0	62·8	70·2	40·4	72·9	44·8	82·2	28·9	260	9	889
	Peak Hill	30·076	30·161	30·370	29·761	66·0	47·7	53·8	79·0	40·3	64·4	44·2	84·2	34·0	156	8	802
	Wiluna	30·076	30·144	30·433	29·682	64·9	45·8	55·4	79·5	36·0	64·1	40·2	84·2	28·9	154	6	670
	Cue	30·083	30·182	30·403	29·739	66·6	45·4	56·0	78·2	38·8	65·0	44·0	81·1	32·5	134	6	704
	Murgoo	...	...	...	...	66·1	45·1	55·6	76·0	38·5	...	...	...	...	189	6	761
	Yalgoo	30·040	30·168	30·391	29·651	64·3	45·1	54·7	76·4	35·0	64·3	42·2	78·0	30·7	226	8	704
	Nunngarra	30·082	...	30·458	29·691	63·5	42·7	53·1	77·8	35·0	...	...	...	...	99	7	670
	Lawlers	30·080	30·192	30·470	29·620	65·0	43·0	54·0	78 0	31·0	62·8	41·6	83·3	29·8	196	5	726
	Laverton	30·070	30·204	30·483	29·589	65·7	44·2	55·0	81·0	32·0	61·8	39·4	86·1	28·3	31	5	718
	Menzies	...	30·188	...	...	63·3	42·7	53·0	75 5	35·0	61·6	41·8	81·6	28·3	200	6	526
	Kanowna	...	...	...	...	62·4	40·9	51·6	76·0	33·8	60·4	40·2	80·3	30·4	126	8	793
	Kalgoorlie	30·038	30·182	30·500	29·449	63·2	43·5	53·4	77·2	34·8	61·4	42·5	80·0	31·4	137	8	859
	Coolgardie	30·064	30·170	30·516	29·504	61 8	42·5	52·2	75·2	34·0	60·9	41·3	79·0	30·4	107	11	958
	Southern Cross ...	30·040	30·162	30·470	29·520	64·0	40·0	52·0	75 0	27·0	61·7	38·6	75·3	25·0	339	9	749
	Kellerberrin	...	...	...	..	...	...	...	...	...	...	...	...	...	282	15	828
	Walebing	...	...	...	...	62·4	41·3	51·8	70·2	29·0	59·8	39·8	71·7	28·2	515	20	1,589
	Northam	...	...	...	...	63·8	44·1	54·0	72 0	32·0	61·2	39·6	72·0	28·9	501	8	1,407
	York	30 020	30·155	30·453	29·491	63·4	44·3	53 8	71·0	32·0	61 8	40·4	71·2	27·6	500	17	1,356
	Guildford	...	...	...	...	64·4	46·3	55·4	72·0	34·5	63·1	43·5	78·1	31·5	1,012	21	2,532

The Climate of Western Australia during July, 1907—*continued.*

Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
					July, 1907.					Average for previous Years.						
	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
South-West and South Coast:																
Perth Gardens	30·986	30·140	30·407	29·419	63·5	50·0	56·8	69·8	39·0	63·1	46·0	72·6	35·0	1012	21	2,531
Perth Observatory ...	30·996	30·144	30·419	29·380	63·5	49·7	56·6	69·8	39·6	62·6	47·4	73·8	36·4	1068	21	2,676
Fremantle	30·998	30·130	30·397	29·436	63·8	52·7	58·2	69·0	43·8	62·6	50·2	73·4	39·0	1325	22	2,654
Rottnest	30·984	30·115	30·386	29·418	63·1	53·8	58·4	67·3	46·2	61·8	52·8	70·0	40·4	701	24	1,896
Mandurah	...	...	...	...	63·4	48·2	55·8	67·4	33·0	62·3	45·0	70·6	31·3	1421	21	3,256
Marradong	...	...	...	...	..	...	...	...	...	...	...	...	...	690	18	1,715
Wandering	...	...	...	...	58·4	43·3	60·8	67·7	29·0	58·5	38·7	68·0	27·8	602	18	1,558
Narrogin	...	...	...	...	..	...	...	...	..	...	...	...	..	...	...	..
Collie	...	...	...	...	59·9	40·7	50·3	65·5	30·5	59·0	36·4	68·7	26·9	822	22	1,978
Donnybrook	...	...	...	...	61·5	44·1	52·8	69·5	32·0	60·5	41·2	70·3	29·7	1029	25	2,444
Bunbury	30·960	30·120	30·390	29·400	62·0	51·0	56·5	67·0	37·0	62·5	46·5	72·2	35·9	842	15	2,081
Busselton	...	...	...	...	61·7	46·7	54·2	68·2	36·4	60·6	43·8	77·5	32·5	1168	26	2,241
Cape Naturaliste ...	30·925	...	30·350	29·330	61·0	52·0	56·6	67·0	45·0	.	...	...	..	1203	28	2,677
Bridgetown	...	...	...	...	60·7	41·9	51·3	66·4	31·0	59·3	38·2	69·1	25·9	671	21	1,860
Karridale	30·975	30·094	30·330	29·160	61·0	55·0	58·0	67·0	39·0	61·1	46·5	70·8	29·3	1488	27	3,561
Cape Leeuwin	30·865	30·059	30·350	29·100	63·0	53·0	58·0	67·0	48·0	61·0	52·3	70·6	43·0	1215	30	3,275
Katanning	30·968	30·126	30·418	29·371	59·1	43·3	51·2	65·0	33·4	58·2	40·4	68·0	25·0	446	20	1,232
Mt. Barker	...	...	...	...	57·4	43·2	50·3	64·8	35·8	...	...	...	...	589	24	1,920
Albany	30·896	30·080	30·365	29·228	61·9	47·7	54·8	69·6	43·0	60·6	44·8	73·5	33·5	662	23	2,097
Breaksea... ...	30·900	30·074	30·380	29·180	55·0	49·0	52·0	67·0	45·0	59·2	49·3	71·8	39·1	475	24	2,137
Esperance	30·960	30·128	30·450	29·330	63·0	46·0	54·5	74·0	36·0	62·4	44·9	77·6	33·0	309	23	1,454
Balladonia	30·022	30·139	30·495	29·360	62·8	41·5	52·2	74·8	31·2	61·1	40·3	81·4	26·2	111	12	699
Eyre	29·989	30·160	30·441	29·406	65·1	44·8	55·0	78·6	35·1	62·4	42·1	88·9	27·2	116	8	807
INTERSTATE.																
Perth	29·996	30·144	30·419	29·380	63·5	49·7	56·6	69·8	39·6	62·6	47·4	73·8	36·4	1068	21	2,676
Adelaide	30·094	30·168	30·506	29·530	58·8	44·8	51·8	69·3	36·1	58·7	44·3	72·5	32·7	281	20	1,256
Melbourne	...	30·025	...	...	...	...	..	...	...	55·5	41·4	68·4	27·0	178	16	1,043
Sydney	30·110	30·115	30·510	29·790	60·0	45·0	52·5	66·0	38·0	58·9	45·7	74·9	35·9	37	3	2,687

The Observatory, Perth, 7th August, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for June, 1907 (completed as far as possible), and for July, 1907 (principally from Telegraphic Reports).

Stations.	June, 1907.		July, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
East Kimberley:				
Wyndham ...	1	1	21	2
6-Mile	...	...	...	...
Carlton	18	3	...	...
Ivanhoe	Nil	...	...	...
Argyle Downs ...	6	2	...	...
Rosewood Downs	...	...	...	...
Lisadell	...	...	...	...
Turkey Creek ...	93	7	Nil	...
Ord River ...	...	...	...	...
Alice Downs ...	...	...	...	...
Flora Valley ...	...	...	...	...
Hall's Creek ...	206	5	Nil	...
Nicholson Plains	..	...	...	...
Ruby Plains ...	296	6	...	...
Denison Downs	...	...	...	...
West Kimberley:				
Mt. Barnett ...	...	...	...	...
Mt. House ...		...	...	...
Leopold Downs...	...	...	...	...
Fitzroy Crossing (P.O.)	209	6	21	1
Fitzroy Station ..	...	...	...	...
Brooking ...	...	...	...	...
Cherrabun ...	102	6	...	...
Bohemia Downs	175	3	...	...
Quanbun ...	50	2	...	...
Nookanbah ...	..	...	...	...
Upper Liveringa	96	1	...	...
Yeeda	65	2	...	...
Derby	171	2	56	1
Pt. Torment ...	202	3	...	...
Obagama ...	127	4	...	...
Beagle Bay ...	196	4	...	...
Roebuck Downs	167	2	...	...
Kimberley Downs	...	...	...	...
Broome	134	4	85	1
La Grange Bay...	128	4	150	1
N.W. Coast:				
Wallal	51	2	22	2
Pardoo	...	...	...	...
Condon	99	4	118	3
DeGrey River ...	75	3	...	...
Port Hedland ...	65	5	65	5
Boodarie ...	68	2	...	...

Stations.	June, 1907.		June, 1907.	
	No of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. Coast—*contd.*				
Whim Creek ...	41	2	62	3
Mallina	...	...	...	...
Croydon	43	2	...	...
Sherlock... ...	..	...	...	...
Woodbrooke ...	77	2	...	...
Cooyapooya ...	80	2	...	...
Roebourne ...	63	2	35	2
Cossack	98	2	31	2
Fortescue ...	93	5	28	4
Mardie	131	5	...	...
Chinginarra ...	145	5	...	...
Yarraloola ..	..	...	...	...
Peedamullah ...	203	2	...	...
Onslow	208	4	98	3
Point Cloates ...	131	7	...	...
N.W. Inland:				
Ethel Creek ..	147	3	...	...
Warrawagine ...	108	2	...	...
Eel Creek ...	...	...	...	...
Muccan	..	...	...	...
Ettrick	106	3	...	...
Strelly	68	2	..	...
Mulgie	...	...	...	...
Warralong ..	108	2	...	...
Coongon ...	92	2	...	...
Talga	.	...	...	...
Bamboo Creek ...	123	4	98	3
Moolyella ...	...	...	...	...
Marble Bar ...	41	2	39	2
Warrawoona ...	110	1	50	1
Corunna Downs	184	3	...	...
Mt. Edgar ...	148	3	...	...
Nullagine ...	54	3	260	9
Bonny Station ...	...	.	...	...
Middle Creek ...	41	2	...	...
Mosquito Creek	...	...	...	...
Roy Hill ...	75	2	...	...
Bamboo Springs	28	1	...	
Kerdiadary ...	116	3	...	...
Woodstock ...	21	1	...	...
Yandyarra ...	Nil	...	...	...
Station Peak ...	28	2	...	...
Mulga Downs ...	...	...	...	...
Mt. Florence ...	50	2	...	...
Tambrey ...	...	...	...	...
Millstream ...	59	3	...	...

RAINFALL—*continued.*

STATIONS.	JUNE, 1907.		JULY, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. INLAND—*contd.*				
Red Hill ...	126	2	...	...
Mt. Stewart ...	...	...	...	...
Coorara	81	4	...	...
Peake Station ...	65	4	...	...
Nanutarra ...	...	...	...	...
Towara	122	3	...	...
GASCOYNE:				
Winning Pool ...	76	4	119	4
Coordalia ...	107	4	...	...
Wandagee ...	100	1	...	...
Williambury ...	36	6	...	...
Yanyeareddy ..	..	. .	...	...
Maroonah ...	81	1	...	. .
Ullawarra ...	86	2	...	...
Mt. Mortimer ...	...	...	...	...
Edmunds ...	..	...	...	...
Gifford Creek ...	83	1	...	...
Bangemall ...	78	3	...	...
Mt. Augustus ...	83	3	...	...
Upper Clifton Downs	80	7	.	...
Clifton Downs ...	172	4	...	. .
Mearerbundie ...	...	...	...	...
Byro	388	7	...	...
Meedo	341	6	...	...
Minnie Creek ...	112	3	...	...
Bintholya ..	..		...	..
Lyon's River ..	98	4	...	...
Mangaroon ...	...	...	...	...
Booloogooroo ...	208	8	..	...
Junction Station	222	6	...	...
Doorawarrah ...	229	6	...	...
Brick House ..	490	6	...	...
Boolathana ...	338	9	...	...
Carnarvon ...	562	6	255	5
Point Charles ...	335	10	...	...
Dirk Hartog ...	873	9	...	...
Sharks Bay ...	619	7	373	7
Wooramel ...	367	5	283	7
Hamelin Pool ...	394	5	264	9
Kararang ...	...	...	...	...
Tamala	775	9	...	...
YALGOO DISTRICT:				
Woolgorong ...	228	6	...	...
New Forest ...	214	6	...	...
Yuin	...	..	...	...
Pindathuna ...	76	3	...	...
YALGOO DISTRICT—*contd.*				
Tallyrang ...	218	7	368	13
Mullewa ...	295	8	383	12
Kockatea ...	286	9	...	...
Barnong ...	237	10	376	9
Gullewa	190	7	292	7
Gullewa House...	211	13	353	11
Gabyon	157	7	...	...
Mellenbye ...	182	9	...	...
Wearagaminda...	164	10	...	...
Yalgoo	115	7	226	8
Wagga Wagga ...	101	5	233	12
Muralgarra ...	178	9	...	...
Golden Grove ...	191	10	224	7
Burnerbinmah ...	167	11	232	13
Nalbara	...	...	...	...
Wydgee	135	8	228	7
Field's Find ...	134	10	166	6
Thundelarra ...	168	10	205	8
Rothesay ...	. .	...	...	...
Ninghan ...	197	6	...	...
Condinguow ...	142	5	...	...
163-Mile ...	.	...	...	...
126-Mile ...	...	...	...	...
90-Mile	143	5	260	...
Wilgoyne ...	...	...	207	10
Mt. Jackson ...	149	7	...	...
MURCHISON:				
Wale	...	...	...	...
Yallalonga ...	240	6	...	...
Billabalong ...	173	5	...	...
Twin Peaks ...	190	5	...	...
Murgoo	211	5	189	6
Mt. Wittenoom ..	212	6	...	...
Meka	253	6	...	...
Wooleane ...	207	7	...	...
Boolardy ...	...	...	...	...
Yederadda ...	271	8	...	...
Woogorong ...	203	4	...	...
Manfred ...	240	6	...	..
Yarra Yarra ...	281	8	...	...
Milly Milly ...	264	8	...	...
Berringarra ...	...	...	...	...
Miloura	174	8	...	...
Mt. Gould ...	125	5	...	...
Moorarie ...	113	7	...	...
Peak Hill ...	159	11	154	7
Minderoo ...	...	...	...	...
Abbotts	137	6	131	3
Belele	160	7	...	...

RAINFALL—*continued.*

Stations.	June, 1907.		July, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
MURCHISON—*contd.*				
Gabanintha ...	159	9	121	4
Bungalow ...	29	3	...	...
Quinns	135	6	...	...
Nannine	166	9	109	3
Annean	174	7	106	4
Tuckanarra ...	200	5	104	4
Coodardy ...	153	6	83	4
Austin Downs ...	125	6	118	6
Cue	125	7	134	6
Day Dawn ...	126	8	131	5
Lake Austin ...	112	6	193	5
Lennonville ...	143	12	205	9
Mt. Magnet ...	111	7	156	6
Youeragabbie ...	115	5	185	7
Murrum	115	5	157	4
Challa	118	4	169	6
Nunngarra ...	169	9	99	7
Berrigrin ...	...	...	...	..
EAST MURCHISON:				
Gum Creek ...	98	4	..	...
Wiluna	107	7	154	6
Mt. Sir Samuel ...	81	4	77	3
Leinster ...	59	6	...	...
Lawlers	88	9	196	5
Wilson's Patch ...	80	3	97	5
Poison Creek ...	47	4		.
Lake Darlôt ...	20	5	34	1
Darda	39	3	...	...
Salt Soak ...	42	8	...	...
Erlistoun ...	...	...	...	...
Mulga Queen ...	39	5		
NORTH COOLGARDIE GOLDFIELDS:				
Laverton ...	55	7	31	5
Mt. Morgans ...	39	9	37	5
Murrin Murrin ...	20	4	47	5
Mt. Malcolm ...	32	2	62	4
Mt. Leonora ...	47	6	48	2
Tampa	27	4	77	2
Kookynie ...	34	8	98	8
Niagara	37	6	156	8
Yerilla	30	4	142	6
Yundamindera .	38	7	45	4
Mt. Celia ...	...	...	...	...
Quandinnie ...	24	5	..	...
Menzies	52	8	200	6
Mulline	92	8	224	8
Mulwarrie ...	71	8	248	6
Goongarrie ...	47	8	175	7

Stations.	June, 1907.		July, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
COOLGARDIE GOLDFIELDS:				
Waverley ...	...	...	...	...
Bardoc	26	3	226	6
Broad Arrow ...	44	8	218	9
Kanowna ...	28	7	126	8
Kurnalpi ...	41	4	161	8
Bulong	50	3	111	8
Kalgoorlie ...	61	5	138	8
Coolgardie ...	85	13	107	11
Burbanks ...	51	6	78	6
Bulla Bulling ...	...	...	...	...
Woolubar ...	50	1	80	2
Waterdale ...	81	7	112	7
Widgiemooltha ...	77	12	152	12
15-Mile Condenser	67	4	119	5
50-Mile	...	...	...	...
Norseman ...	94	7	154	10
Lake View ...	81	11	...	...
Frazer Range ...	57	4	...	...
Southern Hills ...	...	...	...	...
YILGARN GOLDFIELDS:				
129-Mile	...	...	...	...
Emu Rocks ...	148	3	...	...
56-Mile	163	6	222	...
Glenelg Rocks ...	197	3	...	...
Burracoppin ...	164	4	318	8
Bodallin ...	58	2	238	6
Parker's Road ...	.	. .	289	11
Southern Cross ...	86	12	339	9
Parker's Range ...	.	...	...	...
Yellowdine ...	78	5	319	6
Karalee	64	4	220	5
Koorarawalyee ..	94	8	597	16
Boorabbin ...	47	6	267	9
Boondi	51	9	...	...
SOUTH-WEST (NORTHERN DIVISION):				
Murchison House	458	7	...	...
Mt. View ...	279	10	442	9
Mumby	404	10	521	13
Willow Gully ...	515	9	687	18
Northampton ...	445	6	596	14
Chapman Experimental Farm	301	9	539	14
Narratarra ...	...	...	...	...

RAINFALL—*continued.*

Stations.	June, 1907.		July, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (NORTHERN DIVISION)—*contd.*				
Oakabella	394	9	...	...
White Peak ...	444	11	...	...
Geraldton ...	632	11	808	17
Hinton Farm ...	557	...	796	15
Tibradden ...	...	...	...	...
Myaree	449	10	...	...
Sand Springs ...	381	8	871	11
Nangetty ...	400	11	...	...
Greenough ...	540	7	668	14
Bokara	549	13	...	...
Dongara ...	526	11	961	18
Strawberry ...	571	10	587	18
Yaragadee ...	...	...	...	...
Urella	460	10	...	...
Opawa	425	12	457	16
Manara	402	10	545	16
Mingenew ...	442	10	520	13
Yandenooka ...	447	9	605	16
Arrino	359	5	576	16
Three Springs ...	383	18	634	19
Carnamah ...	358	9	615	14
Hill River ...	886	13	...	...
Jun Jun	210	6	...	...
Watheroo ...	399	12	524	18
Nergaminon ...	449	11	...	...
Dandaragan ...	518	11	559	16
Yatheroo ...	549	10	616	18
Moora	427	11	708	16
Walebing ...	498	14	540	19
Round Hill ...	422	13	600	15
New Norcia ...	548	16	426	18
Wongon Hills ...	302	13	...	...
Wannamel ...	761	12	658	16
Gingin	850	12	751	17
SOUTH-WEST (METROPOLITAN):				
Wanneroo ...	815	13	993	18
Belvoir	887	12	996	19
Wandu	842	16	1028	28
Mundaring ...	1028	15	1259	19
Canning Waterworks	786	15	...	...
Kalbyamba ...	...	...	...	...
Guildford ...	872	15	1012	21
Perth Gardens ...	796	17	1012	21
Perth Observatory	878	16	1068	21
Highgate Hill ...	931	14	993	21
Subiaco	895	15	966	23

Stations.	June, 1907.		July, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (METROPOLITAN)—*cont.*				
Fremantle ...	780	15	1322	22
Rottnest	587	17	701	24
Rockingham ...	714	13	1245	21
Jandakot ...	712	13	1254	20
Armadale ...	475	16	...	...
Jarrahdale ...	769	15	1641	19
Jarrahdale (Norie)	...	...	...	...
Serpentine ...	717	13	1208	22
EXTREME SOUTH-WEST:				
Mandurah ...	1126	12	1421	21
Pinjarra (Blythewood)	756	14	884	20
Pinjarra ...	806	12	1196	16
Upper Murray ...	766	14	1178	20
Yarloop	663	13	970	22
Harvey	766	14	929	22
Harvey Downs ...	726	11		..
Brunswick ...	764	11	1170	17
Collie	447	15	832	22
Glen Mervyn ...	457	16	1061	20
Donnybrook ...	503	13	1029	25
Boyanup ...	.	...	1115	18
Bunbury ...	559	14	842	15
Elgin	485	16	1038	25
Busselton ...	518	16	1168	26
Quindalup ...	802	19	1374	24
Cape Naturaliste	653	18	1203	28
Glen Lossie ...	1000	20	1272	29
Karridale ...	942	21	1488	27
Cape Leeuwin ...	948	24	1215	30
Lower Blackwood	569	15	867	25
Ferndale ...	473	15	759	17
Greenbushes ...	383	11	818	18
Cooeearup ...	371	18	.	...
Bridgetown ...	407	15	671	21
Hilton	266	6	549	12
Greenfields ...	333	15	704	17
Dunninup ...	246	3	625	9
Cundinup ...	338	8	412	12
Wilgarrup ...	452	18	744	21
Balbarrup ...	469	11	859	17
Bidellia ...	590	14	1166	21
Westbourne ...	254	12	...	...
Deeside	418	18	729	22
Riverside ...	466	17	735	23
Mordalup ...	316	7	...	...
Lake Muir ...	...	...	...	...

RAINFALL—*continued.*

Stations.	June, 1907.		July, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN AGRICULTURAL DISTRICTS:				
Walgo	410	10	...	...
Dowerin ...	288	11	...	...
Uberin	305	12	...	...
Hatherley ...	306	13	346	14
Momberkine ...	414	9	447	12
Bolgart	...	...	...	...
Eumalga ...	648	16	690	18
Newcastle ...	521	12	704	18
Craiglands ...	793	10	869	16
Eadine	614	15	590	18
Chidlow's Well ...	796	14	1000	21
Baker's Hill ...	513	8	637	18
Berry Brow ...	542	13	606	19
Northam ...	381	13	501	18
Grass Valley ...	332	10	519	9
Cobham	383	14	598	20
York	389	13	500	17
Burrayocking ...	316	13	495	14
Meckering ...	269	9	395	10
Cunderdin ...	246	10	419	13
Doongin	168	7	311	13
Whitehaven ...	306	8	331	11
Mt. Caroline ...	209	9	355	11
Quailing ...	...	...	343	14
Cutenning ...	207	9	281	14
Kellerberrin ...	223	10	282	15
Cardonia ...	196	12	289	10
Baandee ...	174	5	280	9
Nangeenan ...	159	8	291	9
Merredin ...	166	9	293	9
Codg-Codgen ...	234	12	...	...
Walgormouring	229	9	454	12
Mangowine ...	175	9	378	10
Yarragin ...	112	7	413	7
Wattoning ...	...	...	...	...
Koomberkyne ...	242	14	496	17
GREAT SOUTHERN RAILWAY LINE:				
Dalebridge ...	455	13	435	18
Beverley ...	520	12	508	17
Brookton ...	309	8	412	11
Sunning Hill ...	348	15	497	20
Pingelly ...	262	14	475	17
Yornaning ...	214	12	588	18
Narrogin ...	247	8	630	15
Narrogin State Farm	231	5	558	17
Rose Hill ...	...	...	...	...
Wagin	227	11	501	18
GREAT SOUTHERN RAILWAY LINE—*contd.*				
Katanning ...	178	10	446	20
Sunnyside ...	254	13	322	15
Broomehill ...	246	12	324	16
Woodyarrup ...	187	11	333	18
Pallinup ...	139	4	...	...
Tambellup ...	183	10	385	11
Toolbrunup ...	154	11	345	17
Cranbrook ...	222	17	449	20
Stirling View ...	198	16	460	17
Kendenup ...	308	20	622	23
Woogenellup ...	221	12	428	16
Woodburn ...	...	...	...	...
St. Werburgh's ...	251	22	475	24
Mt. Barker ...	268	19	589	24
WEST OF GREAT SOUTHERN RAILWAY LINE:				
Talbot House ...	395	12	...	...
Jelcobine ...	355	9	597	16
Bannister ...	541	14	738	...
Wandering ...	405	12	602	18
Glen Ern ...	398	13	628	18
Marradong ...	390	10	634	19
Wonnaminta ...	298	13	599	20
Williams ...	251	11	614	14
Rifle Downs ...	346	5	...	...
Darkan	...	...	...	...
Arthur River ...	293	11	523	16
Gainsborough ...	235	8	371	17
Glenorchy ...	261	9	675	12
Kojonup ...	273	6	721	15
Northumberland Homestead	238	16	...	...
Blackwattle ...	277	11	...	...
Warriup ...	267	16	496	18
Forest Hill ...	269	19	681	23
EAST OF GREAT SOUTHERN RAILWAY LINE:				
Sunset Hills ...	314	10	...	...
Oakdale	383	9	499	19
Barrington ...	348	9	390	14
Bally Bally ...	306	13	...	...
Stock Hill ...	338	5	435	15
Qualin	285	8	380	14
Woodgreen ...	191	10	...	...
Peakaring ...	269	10	239	13
Glenallan ...	304	13	408	17
Gillimanning ...	270	8	...	...

RAINFALL—*continued.*

STATIONS.	JUNE, 1907.		JULY, 1907.	
	No. of Points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST OF GREAT SOUTHERN RAILWAY LINE—*contd.*				
Wickepin ...	234	6	..	...
Crooked Pool ...	179	5	501	15
Nallyring ...	278	14	447	18
Yardup ..	117	14	255	16
Bunking ...	219	7	...	...
Bullock Hills ...	177	6	454	13
Dyliabing ...	254	11	405	13
Glencove ...	264	14	432	20
Cherillalup ...	99	7	415	14
Strathavon ...	127	13	280	17
Warperup ...	130	10	314	15
Woolganup ...	116	7	...	...
Chillinup ...	...	...	..	...
Jarramongup ...	220	6	283	10
SOUTH COAST:				
Wilson's Inlet ...	460	21	684	22
Grasmere ...	570	20	639	23
King River ...	306	13	492	16
Albany	470	23	662	23
Point King ...	477	16	722	19
Breaksea ...	671	20	475	24
Cape Riche ...	358	8	238	14

STATIONS.	JUNE, 1907.		JULY, 1907.	
	No. of Points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH COAST—*contd.*				
Peppermint Grove	454	15	245	18
Bremer Bay ...	382	11	276	14
Coconarup ...	134	10	...	...
Ravensthorpe ...	153	11	97	11
Cowjanup ...	...	...	...	...
Hopetoun ...	182	6	181	9
Fanny's Cove ...	461	11	...	...
Park Farm ...	510	13	...	...
Grass Patch ...	134	7	...	...
Swan Lagoon ...	101	5	..	...
30-Mile	150	7	...	...
Gibson's Soak ...	290	11	...	...
Myrup	455	11	...	...
Esperance ...	446	15	309	23
Boyatup	480	13	...	...
Lynburn ...	200	10	...	...
Cape Arid ...	...	...	...	...
Point Malcolm ...	204	6	...	...
Israelite Bay ...	133	11	79	15
Nannambinia ...	85	7	...	...
Balbinia	79	7	...	...
Balladonia ...	61	9	111	12
Eyre	118	5	78	6
Mundrabella ...	...	...	...	...
Eucla	78	10	37	7

The Observatory, Perth,
7th August, 1907.

W. E. COOKE,
Government Astronomer.

By Authority: FRED. WM. SIMPSON, Government Printer, Perth.

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OF THE

Department of Agriculture

OF

WESTERN AUSTRALIA.

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NOTES.

Wheat and Flour Shipments.—The total amount of wheat and flour sent away from the Commonwealth since 31st December, 1906, consist of approximately 24,682,670 bushels of wheat and 1,258,356 sacks of flour, together equivalent to 30,722,779 bushels, or 822,931 tons of wheat. The estimated value is £4,830,000.

Parasites.—Mr. Newman, officer in charge of Parasites, reports that he has received three packages from Mr. G. Compere, the Government Entomologist, containing parasites as follows :—No. 1 package, parasites of the soft brown scale. No. 2 package, parasites of the Cabbage Aphis. No. 3 package, Red Scale parasites. These parasites came from Ceylon and from India.

Tailing Lambs.—Those who go in for producing lambs for export must exercise more than ordinary care when "tailing" lambs. Besides cutting the tail at not less than 2in. to 2½in. from the butt, if a lamb bleeds too much the butt should be seared. The length of the tail greatly influences the shape and sightliness of the hind quarters, and this can only be realised when seeing a dressed carcase.

Cereals for the South-Western Districts.—In a recent report Mr. Berthoud, Manager of the Experimental Farm, Hamel, recommended the following crops to be grown by all farmers in the South-Western Districts:—Wheat, Gallant's Hybrid and Tardent's Blue. Oats, Excelsior and Storm King. Maize, Kansas 4568, and Old Gold. The cultivation of Pea or Earth Nuts are also urged as being a crop to give a good return.

Weed Exterminator.—A good and reliable weed exterminator easily made is composed of 6 pounds of arsenious oxide (white arsenic) and 5 pounds of caustic soda dissolved in 1 gallon of water. The ingredients may be bought of any wholesale druggists at the following rates:—Arsenic 18s. per cwt., caustic soda 17s. per cwt. The solution costing a trifle under 1s. 9d. per gallon.

Sheep Breeding.—An interesting experiment was made some years ago in Iowa to test the relative merits of various breeds of sheep. Ten lambs of each variety were selected and fed in the same way. Of the English breeds the Cotswolds gained most rapidly in weight, the Suffolk and Lincoln breeds coming next, and the Oxfords and Dorsets last. As regards yield of wool, the Lincolns came out at the top with a fleece averaging 12.85lb.; the Cotswolds came next, with fleeces of 12.65lb.; the Leicesters, 11.50lb.; Oxfords, 10.95lb.; Shropshires, 8.75lb.; Suffolks, 7.65lb.; Dorsets, 6.8lb.; Southdowns, 6.75lb.; and Merinos, 9.9lb. The most valuable fleeces in natural condition were the Leicesters, the Lincolns, Cotswolds, and Oxfords, following in that order. The Merino fleeces were valued at the least money per lb. in the natural condition, but after scouring commanded by far the highest price. The Merino fleeces shrank no less than 67 per cent. in weight. The Leicesters showed the least, only 38 per cent.

Agricultural Lecture.—On Monday, 26th ult., Mr. P. Wicken, Field Officer of the Department of Agriculture, paid a visit to Gosnell's Siding, and delivered a lecture to the local Progress Association, the subject being "Grasses and Fodder Plants." The lecture was illustrated by lantern slides, and the relative merits of a large number of fodders which might be grown in the district were dilated upon. The lecturer pointed out the necessity of deep ploughing and incessant cultivation as a means of encouraging the growth of fodder plants during the dry weather. The lecture was well attended, there being about 120 settlers present. The lecture was much appreciated by the audience and at the conclusion a hearty vote of thanks was passed to the lecturer and a wish expressed that he would be able to visit Gosnell's and lecture again in the near future.

Breach of Insect Pests Act.—Charles Dorney was charged with that between May 23 and September 4 he had neglected to take proper precautions to eradicate the San Jose scale at his orchard at Cannington. Mr. E. G. S. Hare prosecuted, and defendant, who pleaded guilty, was not represented by counsel. Inspector Lankester gave evidence that on May 23 last he visited Dorney's orchard, which consisted of about 20 acres, and on examination he found five apple and two peach trees slightly affected with San Jose scale. He gave notice to Dorney to have the pest eradicated. On August 6 nothing had been done in the matter, and defendant was again warned. On August 29 Dorney promised if given three days, to have the work done. This undertaking was not kept. Defendant was fined £1 and costs.

Broom Corn.—Inquiries are being made by the W.A. Brushware Co., Duke Street, East Fremantle, for supplies of "broom corn." Samples received by this firm, grown in the South-Western district, have given every satisfaction; and we would urge farmers who have the ground to spare to try a crop. Further particulars, etc., as to price, etc., may be obtained by writing to the above firm direct. Seed may be now sown with advantage.

Lime Juice.—The exports of raw and concentrated lime juice from Dominica increased during 1906 to 300,003 gallons, valued at £44,486, as against 289,100 gallons, valued at £32,966, exported during the previous year. There has also been an increased exportation of green and pickled limes, and the manufacture of citrate of lime is now well under way, as in Dominica the value of exported citrate of lime was £1,503. The general results so far are satisfactory. The important point is to ascertain exactly the advantage offered to the planter by making citrate of lime as compared with concentrated juice. It is surprising that this industry has not been started in this State. There are a number that would thrive in the northern parts where it would not be subjected to frosts, as it is more tender than the lemon. The "Sour Rangpur," however, is an exception, and will do well wherever the sweet orange grows. By budding or grafting on to stocks of *Citrus trifoliata* the trees should the better be able to stand the cold of our winters.

Insect Pests.—With the advance of vegetation we have also the development of insect pests, which in spite of modern science and insecticides galore, come every season with the regularity of the swallow. Nature protects her own, and, in spite of the knowledge that is spread broadcast, and the efforts that are made in this direction, we are no nearer the eradication of common insect foes than we were half a century ago. Our corn crops and root crops are still troubled with the pests that worried our grandfathers, while in animal life disease troubles seem to be on the increase. Go out into the orchard, and ten to one you will find leaves crippled with aphis, shoots being devoured by the caterpillar of the winter moth, and flower trusses made sticky by the presence of the apple sucker. By this we do not mean to say that a philosophical view should be taken of the situation, and no efforts be made to check the ravages of common pests. On the other hand, we must continue to fight, though with the knowledge that we shall not exterminate, and, what is more, we should fight in union. This, unfortunately, is where we fail, and if farmers and fruit growers stood shoulder to shoulder in the battle against insect attacks, the effects would be more marked than is the case under our present spasmodic system—or rather want of system.

A Farmer's Advice.—The following interesting particulars of a farmer's opinion of his work are taken from an exchange :—As to my financial start in life, it was very fortunate : I inherited neither poverty nor riches. Many have asked me, "What do you think of agriculture ? Would you advise me to try it ?" I can say emphatically, "Yes and no." Do you love the soil, do you love to see things grow, are you interested in farm animals, is your

family in hearty sympathy with the work? In this respect I have been most fortunate. No visions of becoming a millionaire have ever disturbed my dreams. There is, however, no better field than the farm for becoming a millionaire in character. If all these things please you, I say "Yes." If, on the other hand, a fine crop of any kind does not attract you, if you prefer the soft hand to the brawny arm, the stuffy, poorly lighted office to the pure air of heaven and its accompanying good digestion, I would say, "Don't engage in agriculture; you are not the man." In conclusion I will say that it is the farmer's privilege to get as much pleasure—I do not say leisure—out of life as any one, if he loves his work. I have found much satisfaction in seeing what I could put into the farm in the way of improvement of the buildings, increasing the fertility of the soil and growing more abundant crops each year. The trees I have planted seem like old friends to me. To-day I have the pleasure of seeing them bowed down beneath their load of fruit. All these things have a value that cannot be estimated in dollars and cents. Yet we must get more cash out of our farms than we put into them or they will not be ours long. We have many of the conveniences of the city home and a good deal purer air, sounder sleep and better digestion. I can see no good reason why I should desire to be anything but a farmer or cease to recommend it to others of like mind. I would not have any reader of this article imagine for a moment that, as a family, we have not led the strenuous life or that we have felt it any hardship to do so. Rather I may say that we have enjoyed it.

Phalaris Commutata.—The new fodder plant *Phalaris commutata* has been tried by Mr. John Furphy, of Hill End, in the Moe district, West Gippsland. The plants were obtained from Mr. Harding, curator of the Botanical Gardens, Toowoomba, Queensland, and Mr. Furphy says it supplies what has been long wanted—a winter feed for stock, as it resists the frosts and keeps growing right through the winter months. Mr. Furthy states that he obtained a few plants, and transplanted them at the end of April of last year, putting them out in drills three feet apart and two feet in the drills. By the end of June they had made a growth of two feet, sending out shoots until by the end of the season as many as 167 seed stems had been produced by one plant, the highest averaging seven feet, while some of the stronger stems obtained a height of eight feet six inches, the clumps measuring two feet across. Although it was a severe winter not a yellow leaf could be seen, and the growth was continuous, with nice soft succulent blades up to the flowering stems. The roots are fibrous, the foliage very dense, and colour a bright green in the middle of winter. It seems to succeed in the colder districts where other plants do not thrive. Autumn planting is recommended, and Mr. Furphy favours giving the plants plenty of room. His plot yielded at the rate of 60 bushels of seed and eight tons of hay to the acre. He cut the crop at the end of January this year, and in 45 days it had grown a second crop, nearly three feet high, the weather in the meantime being very dry. A 5s. packet of seed he reckons will produce 1,000 plants, for subdivision at the end of the first year. As to the milk-producing qualities of the grass, judging by its succulent quality and the abundance of the crop, Mr. Furphy is convinced that it will prove a most valuable fodder for the dairy herd.

When Cows are at their Best.—A Bulletin from the Wisconsin Station (United States) states that a cow is at her best during her fifth and sixth years, up to which time the production of milk and butter-fat by cows in normal condition increases each year. The length of time a cow will maintain her maximum production depends on her constitutional strength, and the care with which she is fed and managed. A good dairy cow should not show any marked falling off until after ten years of age. Many excellent records have been made by cows older than this. The quality of the milk produced by heifers is somewhat better than that of older cows, for a decrease has been noticed in the average fat content for each year until the cows have reached the full age. This is caused by the increase in the weight of the cows with advancing age. At any rate, there seems to be a parallelism between the two sets of figures for the same cows. Young animals use a portion of their food for the formation of body tissue, and it is to be expected, therefore, that heifers will require a larger proportion of nutrients for the production of milk or butter-fat than do other cows. After a certain age has been reached, on the average seven years, the food required for the production of a unit of milk of butter-fat again increases, both as regards dry matter and the digestible components of the food. A good milk cow of exceptional strength kept under favourable conditions, whose digestive system has not been impaired by over-feeding or crowding for high results, should continue to be a profitable producer until her twelfth year, although the economy of her production is likely to be somewhat reduced before this age is reached.

Searing Lambs' Tails.—The earlier and better the freezer lamb can be placed on the export market the more profitable the industry is made to the grower. Anything, therefore, that helps materially to confer these desiderata should be worthy the producers' closest scrutiny and consideration. It is only by making trial of those innovations that promise well that progress is made. And there is no greater enemy to improvement than the idea that because a proposition is new it is necessarily not advantageous, or is unpractical. In the general method of marking and docking the tails of lambs, no advance has been made within the memory of living man, not to say since the introduction of the principle. More care is, of course, taken in the work in Australia than was the fashion thirty years ago, when sheep ran in large mobs at little annual expense to the breeder, and were consequently individually cheap. A few lambs dying after marking, and the checking of growth, fattening, and development, by shock to the system through loss of blood, from which the weak lambs all suffered severely, while the strong ones, though less palpably, were nevertheless affected, was not, in those days, of much real moment. An entirely new situation is now faced. A highly important freezer lamb export trade has come into being, with every promise of a continually developing future upon which to look forward. Sheep and wool, too, are commanding very high prices, while the land of ovine depasturage has also climbed wonderfully in value. All these mean that more and more capital per unit is needed to produce and fatten a lamb or sheep. Where more capital is expended, a quicker and larger return must be forthcoming to render the business solidly profitable. Consequently, the fat lamb must be put on the market earlier than heretofore, and he must be put there as fit as it is possible to make him. But what is the practice now generally pursued? Just as the lamb is making forward strides in flesh and development, he is checked and weakened through loss of blood caused by the present rough and unscientific mode of hacking off his tail. The blood is the life, and it cannot in quantity be taken from any young animal without doing him present injury. Put it at the very best, nature takes time in replacing the vital fluid, and that time is added to the cost of the rearing and rendering the lamb sufficiently prime and ripe for export. The loss of blood is saved, the check is saved, the strain to the system is saved, the time is saved, the drain on the mother is saved, and grass is saved by searing off, instead of cutting off, the lamb's tail. It is a simple innovation, but it spells gain to the lamb owner right along the line. Even in a good warm district it takes two or three weeks to replace that lost blood. That time may make all the difference between a ripe and an unripe lamb in a short dry spring. The flesh of the unchecked lamb also presents, when frozen, a better appearance, and appearance counts for much on the London market. By getting lambs off early in the year you stand to obtain better prices than those ruling later on in the season. The ewe has an opportunity to recover from the drain of motherhood, and, besides, cutting more wool, will be in a better condition for the rearing of the following year's crop, the date of which, too, will also thus lie more in your own choosing. Searing does away with the risk of blood poisoning, which in some parts of New Zealand causes serious losses, and deaths from which were reported in several instances in Victoria last year. Neither is the seared lamb so liable to attacks from parasites, worms, or diseases common to the district, which take advantage of any period of check or weakness, but rarely invade the robust system. Suppose you are not a fattener. Well then, all the same the gain is just as concrete and palpable. Early maturity, increased wool, added value, and weeks of grass saved, count to all. Then to what does the whole cost of searing amount? The work is little, but very little, slower. In large lots no extra hand is needed, while to a small owner a shilling or two would cover any additional work. In a week's marking of eight hours a day it would not entail more than thirty shillings, while, if it only puts on a penny a head it would cause a gain of £50. Searing is not an experiment; it has been proved by thoroughly practical men in Victoria—apart from New Zealand and Tasmania—on several lots of lambs of over ten thousand head each, and on a number of smaller flocks. The verdict is unanimous in its favour. No one who has once tried it will go back to the old method. That should be plain and convincing. In any case the test lies in every grower's hands, and from our knowledge of the men who have seared off their lambs' tails, and swear by the result, we should advise all those interested to make the trial right now.—*Exchange.*

THE ROYAL AGRICULTURAL SOCIETY OF WESTERN AUSTRALIA.

Affiliation of Agricultural Societies.

Meeting, 21st August, 1907, Mr. Alex. Crawford, Chairman.

Present.—The following Societies, which made formal application to be registered as Affiliated Societies, were represented :—1, Nelson ; 2, Wellington ; 3, Northam ; 4, York ; 5, Narrogin ; 6, Geraldton ; 7, Beverley ; 8, Williams ; 9, Great Southern ; 10, Murray ; 11, Southern Districts ; 12, Swan ; 13, South-West Central ; 14, Irwin District ; 15, Pingelly-Mourambine ; 16, Mount Barker ; 17, Kojonup ; 18, Jarrahdale and Serpentine ; 19, Greenough Farmer's Club. The following Societies have affiliated, but were unrepresented :—20, Moora ; 21, Kelmscott.

Mr. Lowe directed attention to delegates being present whose names had not been officially communicated by their respective bodies. To set things in order there were forms now provided which authorised persons could fill in in accordance with the wishes of their societies.

Mr. H. E. Hamersley said he was instructed by the Greenough Farmers' Club to be present and to say the Club was prepared to affiliate with the Royal, but his Club had objections to altering their name. Its history dated from 1870 and carried out the functions of an agricultural society, as the Rules (handed in) would show.

It was resolved, on the motion of *Mr. Layman*, seconded by *Mr. Williams* —" That as the Greenough Farmers' Club has for many years held agricultural shows that it be accepted to rank as an Agricultural Society for the purposes of affiliation."

Mr. C. McKenzie said his position was that his was an Agricultural and Horticultural Society. So far they had not decided to affiliate : it was a question of understanding the state of affairs. They were endeavouring to expand its organisation so as to come in under the rules, and it was only a matter of a short time when they would do so.

The Chairman pointed out that they had till the end of this year to decide.

Mr. Lowe then stated that the present meeting was being held for the purpose of considering the Report of the sub-Committee apointed at the last Conference in relation to affiliation. The conclusions of that sub-Committee was now in the hands of this meeting, and he suggested its discussion seriatim with a view to passing them as a whole.

This was agreed to, and discussion was directed to Item 1—

> The Committee for the time being of the Royal Agricultural Society shall have the power—
>
> (1.) To constitute a final Court of Appeal to which any person aggrieved by the decision of any Agricultural Society may appeal. The fee for each appeal shall be £3 3s.

The Chairman, in reply to Mr. Brunton, explained that the clause was meant to apply to cases where an exhibitor could appeal against a judgment given by a local Society. This clause dealt with the individual and a Society, not between the individual and a judge. In all Societies there were rules and regulations and the decision of the judge was final.

Mr. Lowe instanced the case of an exhibitor who had an animal disqualified, say, at York, and demurred. He could appeal to the Royal by paying the fee of £3 3s. That opened the appeal. He might have an animal disqualified at York on account of being fierce or dangerous.

Mr. Layman asked if the appeal was upheld would the fee be refunded.

Mr. Lowe said No, the fee was for the hearing. Their aim was to discourage appealing and if the fee were 10 guineas there would be still fewer appeals. But there would be no refund if the appeal was upheld, as it cost time and money to arrive at a finding.

Mr. Lavater said that when the question was discussed at the sub-Committee meeting he was under the impression that in the event of the appeal going against the Society the latter became liable for the £3 3s. The party against whom it went was to pay.

Mr. Lowe said that the costs "might" be given against the Society, but not necessarily so.

Mr. Lavater said the Royal could make any award they chose, but in event of the appeal being legitimate in every way and the person who lodged the fee was found to be aggrieved, the cost should be paid by the Society.

Mr. Lowe said they had the power to do so.

Mr. Layman differed with Mr. Lowe. There should not be any trivial appeals, but they should not try and prevent them. A less fee should be charged.

Mr. E. A. Hamersley believed with Mr. Lowe that appeals should be prevented as much as possible. They should amend the clause making the cost of appeal £5 5s., and, if upheld, the amount to be returned. On the other hand, if the case proved trivial the person lodging same should forfeit his £5 5s.

The Chairman objected that on those lines the Royal would be at constant expense for witnesses, etc.

. *Mr. Piesse* thought it unfair that if the appeal was upheld the person lodging it should have to pay.

The Chairman said the board of appeal had power to order the defendant to pay the costs.

Mr. Piesse asked, Why not state it? If a man cannot get justice from the local committee he should be able to appeal to the Royal in the same way that a racing man can appeal to the W.A.T.C.

Mr. Marwick said the fee question was discussed at the first meeting of delegates, when about 17 societies were represented, previous to the appointment of the sub-committee who drew up the present constitution. It was felt to be unwise to encourage appeals: it was a thing unknown in York. If they made the fee £5 5s. it would not alter the position. The 17 societies agreed to accept it as printed, and he would move its adoption.

A delegate considered all the societies would act above-board. As an exhibitor himself, the fee would not matter to him if he thought he was in the right. He was willing to move as an addendum the words "the court of appeal deciding which party should pay the fee."

Mr. Lowe contended that that was in favour of the individual, and not of the Society: they represented societies, and not individuals.

Mr. Piesse seconded the addendum as likely to save the Royal Society a lot of trouble.

It was then resolved that the clause read:—

> (1.) To constitute a final Court of Appeal to which any person aggrieved by the decision of any Agricultural Society may appeal. The fee for each appeal shall be £3 3s., the Court of Appeal deciding which party shall pay the fee.

Item (2) was then discussed, reading as follows:—

> To allot dates on which all Agricultural Shows shall be held. All societies must in each year (on or before a date to be fixed) make written application for a day or days on which to hold their shows.

Mr. E. A. Hamersley considered it would be beneficial if the committee of the Royal had a report upon the allocation of dates. If a representative from each centre, say, of the Great Southern districts, which contained some eight societies, were appointed to act in conjunction with the committee of the Royal it would do away with the clashing of dates and be satisfactory to the societies concerned. For instance, his society applied for 6th November. They found, unfortunately, that Wagin has selected that date. If there had been a report from his district that would not have occurred, as the dates would have been practically arranged by the Great Southern societies, handed to their representatives, and conferred upon with the Royal Society. He would move:—

> That a representative from each of the respective centres be appointed to assist the Committee of the Royal in the allocation of dates for the country societies.

The Chairman said the motion was not exactly in order. What had been agreed to was that the Committee for the time being of the Royal Society controlled the matter. The course suggested would place needless responsibility upon the societies, as the better way would be for the societies in the district interested to communicate with each other as regards dates and arrange between themselves, and then send on their conclusions to the Royal Society for confirmation. There would then be no need to send a delegate to Perth.

Mr. Piesse thought there was a good deal in what Mr. Hamersley had advanced. In the past great inconvenience had resulted from dates clashing, and the suggestion was that the societies should have someone to confer with in deciding upon dates. The Chairman's suggestion did not cover their requirements. The societies on the G.S.R. could meet and decide on dates as was done three years ago, though there was one society that did not adhere to the dates fixed, and thus they were in as bad a position almost as before. If they affiliated the Royal should carry out the whole matter; and the suggestion that local representatives should confer with the Royal was a good one.

Mr. Layman thought the allocation of dates could well be left in the hands of the Royal. He would impress upon the secretary of each society the advisableness of getting in the applications early in the year, so as to give time to reconsider dates if they did not quite suit.

Mr. Hales considered that the secretary had sent out the list of dates in ample time this year, and if any dates did clash there was ample time given to readjust matters. As the governing body, the Royal Society should control these matters. This year as far as possible they had granted the dates applied for. In the future, when affiliation was working, there would arise no difficulty of this kind.

Mr. Lowe said notices were sent out asking for dates to be sent in before the 1st June, which gave ample time for correspondence and alterations; but there was no reason why it should not be made the 1st of May if thought necessary.

Mr. Bull (Toodyay) desired to explain why his society had not joined.

Mr. Piesse moved that he be heard.

Mr. Layman thought that before the question be put he would like to say that the present was a meeting of affiliated societies, otherwise the meeting might be interminable. The position of Mr. Bull was similar to that of Mr. McKenzie. Societies which had not affiliated would be allowed to the end of the year to come in and afterwards raise any point they chose.

The Chairman said it would then be too late.

Mr. Layman said the rules did not bind for all time. If any society was not affiliated their representative should be outside the discussion.

Mr. Piesse was actuated to move the motion because it would be of interest to the governing body to allow these gentlemen to be heard. One gentleman had already been heard, before his society was affiliated. His society had been in doubt as to whether they could affiliate, and there were several other societies on the point of affiliating, the reason they had not done so before being that they were not in possession of all the information their societies desired.

Mr. Lowe read from the circular dated 12th June, as follows:—

> "Will you please submit the enclosed (basis of Affiliation) to your Society at an early date (if your Society be in favour of Affiliation) the enclosed form filled in and signed by the President and yourself (Secretary), and also have a delegate appointed to attend the Conference with power to act on behalf of your Society."

He considered that quite clear, and did not think that the meeting, even if it wished, could hear Mr. Bull.

Mr. Piesse hoped they would not decide on a hard and fast rule.

Mr. Hamersley thought that if the societies could attain affiliation without these formalities there was no object in the motion.

Another *Member* said that if delegates could talk whose societies were not affiliated, his society would remain outside.

Motion put and lost.

Mr. Lowe explained the difference in the position this year compared with later occasions. 'Until now (and even now) there was no affiliation. They could not make hard and fast rules nor could any society be bound by what the Royal Society did, therefore the Royal Society felt that the wisest plan was to try and arrange that the clashing of dates should be avoided. Some societies did not fall in with that idea. Except in one or two instances the dates applied for were granted, practically *pro forma*. As a society the Royal had no power to act, as the scheme of affiliation was incomplete.

The Chairman said the matter of affiliation rested with that gathering.

A Member said that time should be provided when fixing dates to give an exhibitor opportunity to get his stock from one show to another. There should be an interval of at least three or four days between shows so as to allow stock to be removed from the grounds and trucked comfortably to the next show.

Mr. Williams moved—

That the clause as printed be adopted.

Mr. Sounness seconded.

In reply to questions, *Mr. Lowe* said in regard to "on or before a date to be fixed," notice would be given by his Society of such date. The position of the society which did not apply till afterwards would be that they would have to take their chance.

Mr. Kent said it was understood by the delegates at the last Conference that they could appeal against the dates fixed, but he supposed by an oversight the societies were not acquainted with this fact, and were not aware they could not appeal. A serious blunder happened. The Williams and Wagin shows had the same date, and were within 38 miles of each other. No doubt the fixture was not altered as the societies did not know they could appeal against it.

The Chairman pointed out that at the time they were not an affiliated body and possessed no powers, though in one or two instances their attention had been drawn to clashing. They desired to obtain from the present meeting the power to act in such instances.

Mr. Kent thought if there was power to accept and adopt dates there was power to accept an appeal.

Mr. Lowe stated that this was a matter taken in hand by the Minister, and not by the Royal, for this current year.

The clause was adopted as printed, and the motion carried.

Clauses (3) and (4) were passed as read on the motion of *Mr. Lavater,* seconded by *Mr. Layman,* as follows:—

(3.) To confirm or adopt any disqualification or other punishment imposed by the committee of any society.

(4.) To remove at any time any disqualification or suspension. The fee for application for such removal shall be £2 2s.

Clause (5) was then discussed, reading:—

> To register all Agricultural Societies willing to hold Shows under the "Show Regulations" of the Royal, and may approve of By-laws for the use of Societies. A register of all Societies shall be kept at the office of the Royal Agricultural Society. (Applications must be made in writing, signed by the President and Secretary of the Society.) A registration fee of £1 1s. and an annual fee of £2 2s. shall be paid.

Mr. Kent referred to the instance that had occurred of a body that was likely to be debarred if the expression "Agricultural Societies" was adhered to. He moved to insert the words "or other bodies" after the word "Societies."

Mr. Lavater said it was better to insert the name of the Greenough Farmers' Club in the clause instead of "other bodies," as otherwise poultry and other societies might claim inclusion.

Mr. Hales asked for a definition of "Agricultural Societies." If a farmers' club held a show of stock and fruit, was it not an "agricultural society"?

The Chairman said it might only be a social club.

Mr. Kent's motion was agreed to, and the words "or other bodies" was agreed to.

Mr. Lowe asked for an expression of opinion as to whether Poultry, Horticultural, Dog, and other Societies were thus admissible.

Mr. Lavater was opposed to any but "agricultural societies" being included.

A Member wished to alter the fees named in the clause to a registration fee of £1 1s. and an annual fee of £1 1s.

Mr. Lavater pointed out that the question of fees had been thoroughly discussed at the Conference and by the Committee, and as there was a large number of societies these fees would be eaten up in printing and other petty expenses. If the fees were lowered the Royal Society would be working at a loss.

Mr. Hales said that the fees had been higher before and were reduced as printed, to the lowest possible sum.

Mr. Layman proposed an amendment in regard to fees:—

> That a registration fee of £1 1s. and an annual fee of £1 1s. shall be paid.

He felt that when things were on a fair footing the expenses would not be nearly so great.

The amended was seconded.

The seconder said that his was a poor society, and the little they had in the way of funds they could not spare.

Mr. Lowe said that when the matter was first brought up the Royal Society (with its usual generous spirit) had left the amount blank. There was a long discussion about it at the last Conference, and some members wanted it to be £3 3s., other suggested £5 5s. The members present agreed to recommend the amounts as printed, namely £1 1s. and £2 2s. Whatever the present meeting did, they must remember there was a certain amount of annual expenditure. Twenty-one societies had affiliated at £2 2s., making £44 2s., and of that more than half would be swallowed up in clerical work, postages, advertisements, etc.

A Member pointed out that the Royal would not get much more out of it than plenty of abuse. The allotment of show dates was a doubtful honour to hold, and any less fee than £2 2s. was not reasonable.

Mr. Sounness considered the fees ought to be as printed, and it was a poor society indeed that could not pay them.

Mr. H. Hamersley preferred to have it £1 1s. in each case. The first payment would mean £3 3s. in all, or over £60, and according to Mr. Lowe only about 20 odd pounds would be needed. It mattered not that some previous meeting had decided on these fees: they were there to-day to discuss the matter themselves.

The Chairman said that it was recognised that the duty of an agricultural society did not end with the holding of a show. Affiliation with the Royal did not relate merely to the holding of shows. There was a much larger responsibility involved. For instance, practically the whole of the agricultural community was unrepresented in Parliament. The affiliated societies would expect to receive a mass of information from the Royal on different matters, and it was hoped that affiliation would in this State take much the same place as the chambers of agriculturists did in the Eastern

States, and will be probably more expensive. It was hoped to widen their scope, and that meant expense. The Royal had been at much expense, but did not grudge that, because if the industry was placed on a better footing through affiliation it would be money well spent. Hitherto they had been as twigs that could be easily bent, but as a united body they would be potent for good.

Mr. Layman gathered that it was the intention of the affiliated societies to become a political power.

The Chairman: No, certainly not.

Mr. Layman: The Chairman had referred to Parliament. Certain societies he had been connected with were very averse to being considered a political organisation, and if that were the idea it would not meet with the approval of the country societies.

Mr. Sounness's society also objected to the political aspect. But in regard to the fees, they should be adopted as printed, as the societies present at the Conference had agreed to them, and further, present discussion was waste of time.

Mr. Hales said that it was agreed to in Bunbury.

Mr. Layman's amendment that the fees be £1 1s. registration fee and one guinea annual fee was put and lost by 11 to 6.

It was resolved to insert the word "Agricultural" between "hold" and "Shows" in first line.

The motion was then put and carried, the clause to read as follows:—

> (5.) To register all Agricultural Societies or other bodies willing to hold Agricultural shows under the "Show Regulations" of the Royal, and may approve of By-laws for use of Societies. A register of all Societies shall be kept at the office of the Royal Agricultural Society. (Applications must be made in writing, signed by the President and Secretary of the Society.) A registration fee of £1 1s. and an annual fee of £2 2s. shall be paid.

Clause (6) was then put and carried as read on the motion of *Mr. Hamersley*, as follows:—

> (6.) To grant permission under special circumstances to any Agricultural Society to suspend, alter, or amend, for their own use, any Show Regulation or By-law.

The Chairman, in reply to Mr. Layman, said a request for permission would have to be submitted to the Royal Society.

Clause (7) was then discussed, reading:—

> To generally supervise all Agricultural Shows held in Western Australia.

Mr. E. A. Hamersley (Williams) asked for some explanation in regard to the word "supervise."

Mr. Lowe replied that what was in the minds of the Committee at the meeting was the wording of a similar clause in the Turf Club Rules, from which this clause was taken verbatim. At the Conference meeting a similar question had been asked by Mr. Lavater, and he (Mr. Lowe) had said (p. 13 of report) :—"I can tell you how it was that that clause was inserted. It is exactly similar to one in the Turf Club rules governing the Turf Clubs generally throughout the State, and is identical to 'generally supervising.' We say 'Agricultural Shows," they say 'Racing Clubs.' You give this power to a governing body, but I take it that nobody anticipates supplanting or taking the place of any particular local officials. I do feel that this clause is necessary, perhaps not in that exact form, but you must convey the same meaning. It has been considered necessary by the Racing Clubs. The racing regulations were framed upon the best legal opinions to be obtained in Western Australia in those days. We were guided largely by an expression of opinion at the last meeting of delegates, when it was said that the meeting wanted us to take control of the Agricultural Societies in a manner similar to that in which the W.A. Turf Club controlled the racing bodies, and we thought we could not do better than adopt some of their regulations. These are the reasons for the insertion of this clause. I think you can leave with safety in the hands of my Committee the question whether we will interfere in the management of Shows. We have enough in our internal management to look after. The rule though will have to be fairly strict, otherwise the whole scheme will fall to the ground." The wish was expressed by the Minister for Agriculture, when the scheme was submitted to him, that there should be some one body that he would be able to refer to as to whether the Shows generally, or any one particular Show, were being worked satisfactorily. The Royal Society had no wish to add to their expenditure by sending representatives to undertake detail work in any shape or form at any of the Shows. Personally, he had any amount of his own work to do as Secretary. At the meeting of the Sub-committee they could not see that they could use any other word that would convey a better meaning than "supervise." It might be that the present meeting could coin or discover a better expression. As the governing body they should have some right to suggest or, if necessary, to urge that certain alterations be made in the conduct of Shows where considered necessary. His society would be only too glad to adopt any other expression that they might not consider so irritating.

Mr. Layman considered the word to be correct. The Royal did not purpose sending anyone down to dictate how shows must be run.

Mr. Hamersley said he was merely in search of information, and tendered the Secretary of the Royal his thanks for the lucid explanation given.

The Clause (7) was put and carried as printed.

Mr. Layman said he had been entrusted by his society with a motion they had carried unanimously, to the effect that the present Conference suggest to the Royal Society that they should move in the direction of having Rules and Regulations and By-laws gazetted, and thus made law. In other words, an Act of Parliament should be introduced to legalise them. He took it there would be a number of appeals from time to time and the Royal Society would require some law upon which to go, otherwise litigation might result. If this were not done they would be in the same position as the W.A.T.C. before the passing of their Act.

Mr. Lowe said they were an incorporated body.

The Chairman did not think that fact would cover them in event of appeal. If anyone appealed against the local body to the Royal, the latter might reverse the decision and either party could take the matter to the Supreme Court. Who would pay the piper? The decision of the country society might be upheld by the Supreme Court, reversing the decision of the Royal, and the latter be mulct in heavy costs. A Bill similar to the

W.A.T.C. Act should be introduced. That club had once had to pay heavy damages, and afterwards put a Bill through the House.

Mr. Lowe thought the suggestion excellent, but feared they could not accomplish it. Being an incorporated body as the Royal Society was, such incorporation allowed them to alter, amend, or add to their Rules by a certain majority at a meeting. That might cover the ground in this case. At the next half-yearly meeting these conditions of affiliation would be added to their Rules, and they would then be safeguarded as far as they were individually concerned, unless they were rejected by the Governor in Council. It was expensive to get a Bill through Parliament.

The Chairman thought the question one of considerable importance, and dubted if Mr. Lowe's suggestion would hold good in case of an appeal to the Court. It should be carefully considered, and if a Bill was to be brought before Parliament ways and means would have to be found for the purpose. But whatever was decided should be decided at the present gathering, as it might be long before such a representative meeting could again assemble.

Mr. Layman did not think the expense would be great, as the Crown Law Department could draft the Bill and the Minister would gladly assist, and so long as the Minister for Agriculture fathered the Bill there should be no expense entailed.

Mr. Lowe said in that event the Act would govern not only the present scheme of affiliation, but all the societies. If this was decided upon, it should be in the form of a recommendation from all the agricultural societies to the Minister for Agriculture.

Mr. Layman moved, seconded by *Mr. Gale*:—

> That the Minister for Agriculture be requested to immediately introduce a Bill to Parliament whereby the Constitution of the Affiliated Societies be gazetted, and become law.

Carried unanimously.

Mr. Lowe drew attention to the omission of reference to the Schedule of Prizes.

The Chairman said that the point was discussed in this way, that it was understood a skeleton of prizes was to be drawn up by the societies and submitted.

Mr. Lowe said that at the last Conference there was a clause (8) to the effect "that all registered Societies shall submit for approval a list of judges and schedules of prizes, and shall work under the Rules and By-laws of the Royal Agricultural Society." He thought some mention of this point should be included here.

Mr. Marwick was clear on the subject. It had been omitted here by error. It was necessary that a skeleton schedule should be submitted to the Royal Society before going to the printer. Mistakes were often made by new societies especially, and probably the advice of the Secretary of the Royal Society would set them right and keep them right for all time afterwards, and there would be no recurrence of any trouble in that direction.

Mr. Marwick, seconded by *Mr. Lavater*, moved:—

> That all Societies shall submit for approval each year their schedule of prizes before same is printed.

Mr. Layman asked if the schedule was to be made out and sent to the Royal Society for their approval?

Mr. Lowe stated that the reason this was inserted was the request of the Minister for Agriculture, who thought that often prizes were given in a wrong direction, whereas a little alteration in the wording to meet the wishes of the local society would often obviate a good deal of heartburning and trouble, and possibly appeals. Rules might perhaps be in themselves complete while the schedule of prizes might not be in accordance with them.

Mr. Layman thought it might prove a hardship on those societies receiving offers of special prizes at the last minute, as often happened. How could that point be considered and returned to the society in time to be printed? As long as the society had power to add any special prizes that came in at the last moment he would support the motion.

Mr. Hales said that the point was discussed and it was decided that the previous year's schedule should be put in.

Mr. Lowe said that was the present practice.

The Chairman said the idea was to prevent classes being put in that were of no use. A schedule could be made out and enlarged or abbreviated so as to give an idea as to what would be the best classes, especially as regards stock. Although the skeleton might provide for a large number of classes there would be no reason why they should not put them in.

Mr. Kent said mention was made of "Special" prizes. If a donor was willing to give one he did not think the Royal Society or anyone else should object.

Mr. Lowe said they did not accept all they were offered, as an offer might be made for some object not in the best interests of agriculture in a locality. A prize might, for instance, be offered for the best bundle of stinkwort. It should not be allowed.

The Chairman thought if Special prizes cropped up the Secretary could communicate the fact.

Mr. H. Hamersley pointed out that there was a good deal of work involved in making up a schedule, and he would warn those who were inexperienced that they might fall in in having to submit a schedule at the last moment. The Royal had already a pretty big handle against the country districts as it was. He moved an amendment:—

That that proposition be blotted out *in toto*.

Mr. Lowe pointed out that it was impossible to "supervise" a thing until it was in existence, and the schedule of prizes was a thing issued beforehand.

The Chairman thought the difficulty might be met by submitting last year's schedule with the proposed alterations in it. Or, by the Royal Society drawing up a model schedule on which all other schedules should be based.

Mr. Marwick did not see how the difficulty was to be overcome unless some form of supervision was exercised. There were some people who offered prizes for crossbred sires, and the Minister for Agriculture had stated that he would not subsidise societies who offered prizes for any but pure bred sires. If the societies were going to run on the old lines, they had better not affiliate. Affiliation meant the betterment of all societies. His society was one of the oldest in the State, and were open to conviction, and the Royal could put them right in many instances, and the younger bodies might well submit to the Royal, who would put them on a business footing. Once put right, they were right for all time. He could not see that Clause 7 was going to regulate the schedule of prizes. His society had

Mr. Horace Warburton's Homestead, St. Winburgh, near Mt. Barker.

submitted their schedule to the Royal, and some small errors were at once rectified and the matter made explicit, and their schedule was now in hand and in proper form, and in the future there would be little trouble in keeping it so. The matter had been thoroughly discussed and this clause considered necessary.

Mr. Brunton said it meant that a young society like his was getting the benefit of the experience and advice of the Royal Society. It was a capital idea to submit it to them, and the W.A.T.C. make a similar provision one of their leading points.

Mr. Layman thought the idea good, but would like the country societies to have power to put in prizes (special) between the date of issuing the schedule and the date of the show.

Mr. Lowe suggested the word "proof" instead of "skeleton," and it was resolved that the clause be numbered (8) and read:—

> (8.) That all registered Societies shall submit each year for approval, before issue, a proof schedule of prizes.

On the motion of *Mr. Layman,* all the clauses from (1) to (8) were then adopted, unanimously.

Mr. Lowe said that he was pleased they had been adopted unanimously, as his society had no wish to force the matter; far from it.

Discussion proceeded to the item.

Registration of Societies.

Mr. Lowe suggested that the footnot headed "*Memo*" should be embodied in the "Registration of Societies" clause.

Mr. Lavater agreed, but as it was ambiguous he would suggest substituting the words "existing societies holding agricultural shows" for the words "any agricultural society" in last line but one of "*Memo.*"

The two clauses read as follows:—

> Registration of Societies.
>
> After the 31st December, 1907, no Society shall be registered unless the Royal Agricultural Society is satisfied that it will be in the best interests of the State generally that such society be registered. Notice of the receipt of such applications shall be forwarded to all registered societies.
>
> *Memo.*—The Royal Agricultural Society, while approving of above conditions, recommends to the meeting of delegates that an addition be made giving the governing body discretionary power (for three years) to grant exemption from affiliation to any agricultural society making application and showing special reasons.

Mr. Parkes thought the power proposed to be conferred was capable of abuse. There was a species of union among the established societies, and from feelings of policy they might use their influence to prevent the formation of a new society. It had been stated that there were already too many societies and too many shows. When a group of men in a new district found themselves sufficiently strong to form a new society to promote the interests of agriculture they should be so entitled, without having to consult any body.

Mr. Lowe said they were able now, but they would not necessarily be registered.

Mr. Parkes considered they should exclude the possibility of injury being done to the rights of anyone.

It was resolved that the combined clauses read:—

(*a*) After the 31st December, 1907, no society shall be registered unless the Royal Agricultural Society is satisfied that it will be in the best interests of the State generally that such Society be registered. Notice of the receipt of any such applications shall be forwarded to all registered societies. Discretionary power is also given to the Royal Agricultural Society to (during the next three years) grant exemption from Affiliation to existing societies making application and showing special reasons.

Official List of Judges.

(*b*) Societies are required to forward for approval, without delay, the names and addresses of those persons considered to be capable judges. From such information an official "list" of approved Judges will be compiled, such list will be subject to revision by the Committee of the Royal Society.

Mr. Piesse asked if this would apply to all classes. The question of industrial classes had cropped up.

Mr. Lowe replied that some of the lists of judges of the societies were already in, and none but live stock were included.

The clause was passed as printed.

Society's appointment of Judges.

From such lists the judges of all agricultural shows *must* be appointed. A list of the judges appointed to act at the year's show must be forwarded to the Secretary of the Royal.

Mr. Layman proposed to insert the words "live stock" before "judges," and "to take effect from 1st January, 1908."

Mr. Lowe explained that the society concerned appointed certain judges approved on the list. If one failed to attend, the best available man should be secured. The wording was "must appoint, not "must act."

Mr. Parkes said that such cases had happened and someone had had to be appointed who was at hand.

The clause was agreed to, to read:—

Society's appointment of Judges.

(*c*) from such list the live-stock judges of all agricultural shows *must* be appointed. A list of the judges to act at the year's show must be forwarded to the Secretary of the Royal, to take effect from 1st January, 1908.

Disqualification.

Live stock having been exhibited at an unregistered agricultural show will be disqualified from competing at any registered agricultural society's show. The exhibitor of such stock will also be disqualified.

Mr. Piesse thought if the clause were passed friction might arise.

It was decided to insert after "Agricultural Society's Show" the words "This does not apply to exempted Societies."

The clause was then passed to read:—

Disqualification.

(*d*) Live stock having been exhibited at an unregistered Agricultural Show will be disqualified from competing at any registered Agricultural Society's Show. The exhibitor of such stock will also be disqualified. This does not apply to exempted Societies. [See Clause (a).]

Mr. Lowe pointed out that exemption only applied to Societies in existence.

Mr. Marwick felt that there were 21 societies affiliated which had the interests of agriculture at heart, and unregistered societies should be treated as unregistered racecourses and unregistered meetings. All the societies should be included in the Affiliation, and none of them would have cause to regret it.

Mr. Sounness thought it was better not to force people in, but rather to draw them into Affiliation.

All the clauses were then put and passed.

A vote of thanks was unanimously accorded to the Chairman (Mr. Alex. Crawford) and the Secretary of the Royal Society (Mr. Theo. Lowe).

The Proceedings then concluded.

APPENDIX I.

Circular to Agricultural Societies.

Department of Agriculture,
Perth, 7th June, 1907.

The Secretary,

Sir,

When I had the pleasure of meeting the representatives of the various Agricultural Societies of the State during the Conference on the 26th March last, I extended an invitation to them to meet me in July for the purpose of discussing matters of interest to agriculturists generally.

I now beg to notify you that I have decided upon Wednesday, the 21st of August next, for the Conference to meet at the Lecture Room of the Department of Agriculture, at noon.

It seems to me that the question of the importation of food stuffs should form the basis of our Conference. A list of farm and dairy imports into this State during 1906 is enclosed.

I shall be glad if your Society will give consideration to the various items appearing on the list that might well be raised in your district. We could then confer as to the best means of bringing about the development of the various industries for which your locality is fitted. It would also be of advantage if you considered any other item of interest to your district and to the State generally.

If you could advise me by the middle of July of the conclusions you have arrived at, an Agenda Paper could be prepared and despatched to your Society.

You will see from the list of imports that we send out of the State some £2,095,992 for farm, dairy, and agricultural produce. Whilst, I think, we might well set out with the idea of curtailing these importations, we should also consider the question of ourselves becoming exporters.

Our wheat growers and orchardists have now to seek a market overseas, and I am very hopeful that we shall, in the near future, export other articles of local produce.

Whilst Western Australia, with a population of 262,000 and a total area of 624,588,800 acres, finds it necessary to import food stuffs for her people, South Australia with a population of 375,000 and a total of 578,361,600 acres, exported in 1905-6 18,000,000 bushels of wheat, 39,500,000 lbs. wool, and in the first half of the year 1905 13,912 carcases of lamb.

When it is remembered that each State of the Commonwealth will repeat her exports every year to an increased extent, and that the London market is practically limitless, we must realise that the question of turning our lands to the fullest account is of serious consequence to this State.

In asking you to meet and confer with me on Wednesday, the 21st August next at noon, I am actuated, first, by the necessity that we must produce sufficiently for ourselves; and, secondly, that we must develop our export trade.

I shall be glad if you will appoint two representatives from your District and furnish me with their names, when I shall be pleased to forward the necessary railway passes.

Yours faithfully,
JAMES MITCHELL.

APPENDIX II.

List of certain Farm and Dairy Products Imported into Western Australia (referred to in Appendix I.) which the State is herself capable of raising, for the Year 1906.

	Australian Origin.	Total Imports.	Totals Summarised.
	£	£	£
Ale and Beer	11,363	82,862	82,862
Animals, Living—			
Horses	54,519	55,129	
Cattle	54,989	56,749	
Sheep	97,003	98,481	
Pigs	395	397	
Other	2,486	3,678	
			214,434
Biscuits	15,077	17,302	17,302
Butter	340,356	340,516	340,516
Candles	2,542	3,132	3,132
Cheese	27,758	31,241	31,241
Eggs	64,495	64,776	64,776
Fruits, Dried—			
Currants	58	6,195	
Raisins	5,296	7,130	
Other	2,653	4,732	
			18,057
Carried forward	...	...	772,320

APPENDIX II.—*continued.*

	Australian Origin.	Total Imports.	Totals Summarised.
	£	£	£
Brought forward ...	...	...	772,320
Fruits—Fresh—			
Apples	8,615	9,949	
Bananas	8,941	9,892	
Oranges and Lemons	4,122	12,888	
Other	3,254	3,520	
			36,249
Grain—			
Barley	3,595	3,705	
Beans and Peas	1,935	2,712	
Maize	2,213	2,223	
Oats	70,550	87,552	
Wheat	5,034	5,046	
Other, unprepared	432	876	
Bran, Pollard, and Sharps	72,761	73,426	
Flour	43,536	47,949	
Malt	26,325	52,212	
Oatmeal	13,663	16,018	
Other, prepared	6,754	10,335	
			302,054
Hay and Chaff	20,243	20,257	20,257
Honey	1,479	1,479	1,479
Hops	9,975	19,999	19,999
Jam and Jelly...	59,491	62,337	62,337
Leather	29,880	34,727	34,727
Linseed	49	432	432
Linseed Cake and Oil-cake	3,652	4,354	4,354
Meats—			
Bacon and Ham	122,253	122,819	
Preserved by cold process—			
Beef	2,797	2,797	
Mutton and Lamb	44,158	44,160	
Pork	3,300	3,300	
Poultry	3,713	3,724	
Rabbits and Hares	1,934	1,934	
Other	598	598	
Preserved in tins	71,365	81,962	
			261,294
Milk—			
Concentrated	6,709	9,356	
Preserved	13,028	87,975	
			97,331
Onions	14,763	15,491	15,491
Pickles and Sauces	10,641	25,533	25,533
Potatoes	98,108	99,242	99,242
Soap	16,490	27,690	27,690
Spirits (Brandy and Whisky)	3,574	116,820	116,820
Stearine	18,720	18,720	18,720
Tallow	195	195	195
Tobacco—			
Manufactured	68,022	83,422	
Unmanufactured	...	1,321	
Cigars	3,336	17,440	
Cigarettes	20,823	37,168	
			139,351
Wine (Sparkling and other)	21,735	40,117	40,117
Total	...	...	£2,095,992

POULTRY NOTES.

By Frank H. Robertson.

Poultry at Narrogin Farm.

The breeding pens are all now in full working order, and the birds are laying well. There are altogether 23 breeding pens mated up, representing the following varieties, viz.:—White Leghorns, Brown Leghorns, Buff Orpingtons, Minorcas, Silver Wyandottes, Black Orpingtons, Andalusians, Plymouth Rocks, Indian Game, Pekin Ducks, Indian Runner Ducks, Toulouse Geese, and Bronze Turkeys. In mating the pens, utility qualities receive first consideration and fancy show points secondary, the laying qualities of the birds being of first importance, with the object of supplying to farmers a good class of stock. It is hoped by this means that an improvement may be made in the quality of the poultry seen on the lands of the greater number of the farmers of this State.

There are about 200 head of cockerels and pullets for sale, among them being White and Brown Leghorns, Silver and White and Partridge Wyandottes, Plymouth Rocks, and Minorcas. Settings of eggs are also now for sale at 2s. 6d. a dozen delivered to any railway address in the State. All eggs not hatching replaced provided the old eggs are returned. This is a very liberal guarantee. Incubator lots of eggs are supplied at reduced prices.

Five incubators are now in use, and brooders of various makes and designs. The present is a good time to inspect poultry, and all persons interested or desiring information relating to the industry are invited to pay a visit.

Country Shows.

This month and the next are the agricultural show season all over the State, and are looked forward to for many months past with keen interest, by both exhibitor and onlooker resident in our country districts. Of late years the poultry section has made vast strides both as regards the number and quality of the exhibits. Nearly everyone who goes to a show has a look at the poultry. Many are deeply interested in the feathered section, others are remarkably apathetic, and some fail to understand the value of show birds. From *Garden and Field* I cut the following, which aptly describes the point:—

"One day at the P. and K. Show we met a man whose god is utility with a very big capital U, and we at once fell into an old argument on 'the place of the show bird.' Halting in front of one of the winning Orpingtons our friend said, 'Look at this chap; too full in feather, too big to grow to a profit, and too soft to look after himself on a farm. What's he worth?' Beyond replying that the bird was probably worth twenty guineas of anybody's money we had nothing to say to this tirade. 'Now look at this fellow,' said he, pointing to one lower down, 'More active, finer in bone, more of a hustler, worth twenty of the other.' This was getting serious, so we said, 'All the birds here were bred in the hope of getting that one you object to, were they not? He is in fact "the standard."' 'Yes, that's so.' 'Well, then, he is responsible for all of them, the one you like included.' 'Yes, go on.' 'Now look at this one,' we said, pointing to the worst in the class, small, leggy, coarse, with no breast to speak of. 'Suppose this were the "standard" of the breed, the average bird would be as much below your favourite bird as this one is below the winner. See the point and the value of having an "ideal" standard as a means of keeping up average quality.' 'H'm, well, yes, I own up. Come and have —— a look at the dogs.' We mention this little incident because we think it illustrates the actual practical value of shows."

The Poultry Industry in America.

Mr. Edward Brown, the Secretary of the National Poultry Organisation Society of England, has recently made a trip to America. His report, which has been printed in book form, proves most interesting reading, and gives a splendid idea how operations are carried on in the United States. I will briefly run through some of the most interesting items he refers to, using his own words in most instances.

At the Rhode Island Agricultural College and other institutions much more attention is paid to instruction in "fancy" poultry breeding than is the case in England. Men seeking situations as managers of poultry plants must be qualified to deal with exhibition stock.

The bulk of eggs and poultry consumed in the States, and of poultry exported, are produced by farmers, not at poultry farms.

The value of eggs and poultry produced in the States during 1905 was estimated at rather more than one hundred million pounds sterling.

Dealing with the large poultry plants, Mr. Brown says many have failed. Numerous plants have never paid their way, others have succeeded by the introduction of secondary but profitable sources of revenue. But that some have proved successful cannot be doubted, when due regard is paid to economic and hygienic principles. Capital is of great importance, but the personal equation must accompany it, and is supreme. At one place visited there were 5,000 laying hens in addition to the breeding stock. The aim is to keep 10,000 hens for laying. The owner has already invested £6,000 in his poultry plant, and is prepared to increase the amount to £20,000. Mr. Brown is not altogether in favour of these very large plants on account of the danger of keeping too many fowls on the land, for it is a common belief that 200 birds can be kept per acre year after year; and on the question of overcrowding he says: "In a country with so much land available, it is startling to find, even in rural districts, the cramped yards in which fowls are kept. Freedom of range does not seem to be thought of even where there is no apparent reason for restriction."

One of the most surprising features is the almost total absence of suburban and small poultry keepers, who occupy a considerable place in our home production, the reason being on account of the small area of ground suburban residences are built on, also the custom of open courts without fences or back gardens; and, secondly, there would appear to be a feeling that it is hardly worth while to cultivate the ground or to keep fowls, and that unless a man can keep poultry on a larger scale, as a business, he prefers to leave them alone.

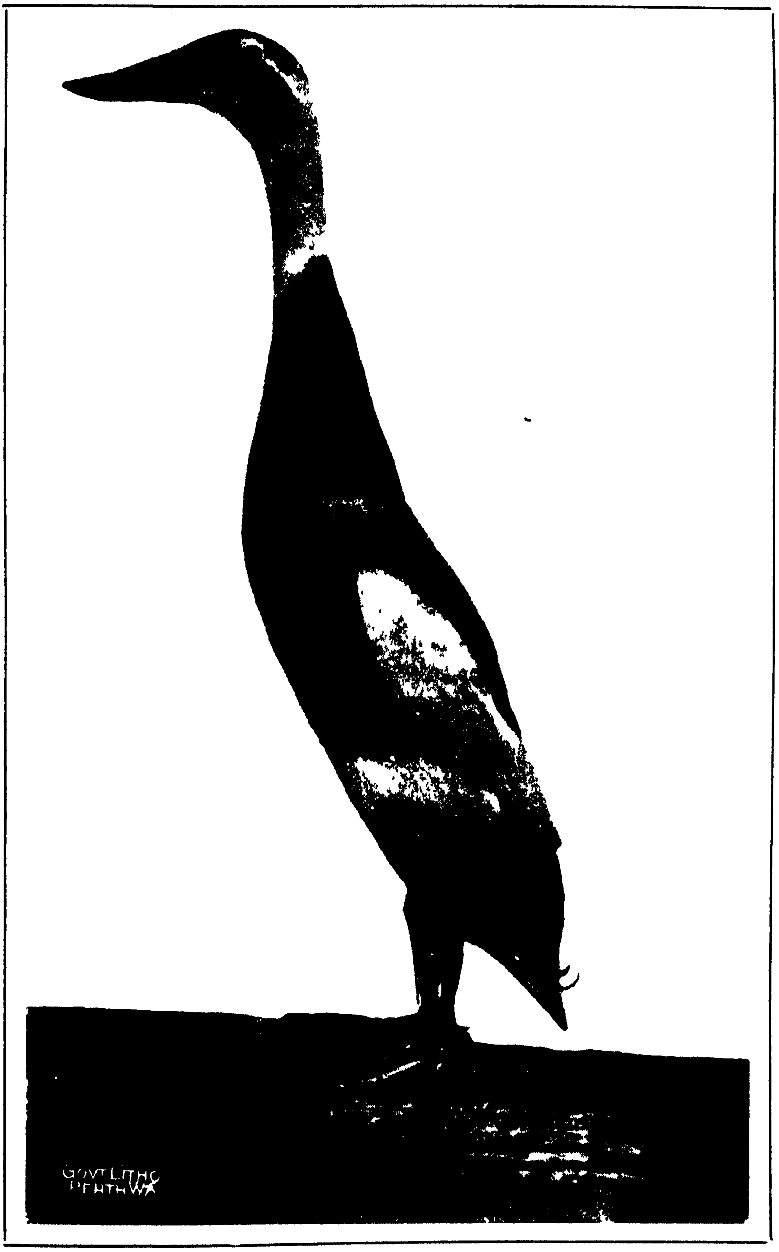
Light sandy soil is preferred to richer and heavier. The reason given is that the manure is said to pass through quickly, and consequent less danger of tainted soil. Mr. Brown, however, points out that the evil result is only delayed, not prevented.

Speaking of the Lakewood Poultry Farm, one of the most successful poultry plants, which has been running seven years, was commenced with a capital of 2,000 dollars by a city man, who gave up a promising commercial life in New York. Last year a profit of 7,000 dollars was made. The area is 60 acres of sandy land, and the capital now invested amounts to about 20,000 dollars. The birds kept are all white Leghorns. The hens are kept for two years, and only second-year birds are used for breeding, then sold at the end of the breeding season. Careful selection has raised the egg production from 90 to 169 over the entire flock of yearlings. He does not use trap nests at all, but selects by length of back, depth of body, posterior development, and general health. The production last year amounted to 50,000 dozen eggs, sold mostly for consumption; but eggs are also sold for hatching. One order was 10,000 eggs for a new plant. Nearly all the eggs are sold by contract, and the lowest price is 1s. 4d. per dozen delivered in New York and other centres, rising to 2s. 6d. in the winter months. These prices are for high-class eggs. Western States' eggs sold in New York fetch much lower prices, down to as low as 8½d.

Speaking of another plant. The main part of the stock consists of white Leghorns, although Plymouth Rocks and white Wyandottes are also kept. The first named are thought to be the better layers, and also the young cockerels make more money, for they are killed off as squat broilers when weighing from ¾ to 1lb. each, which weights are attained in eight weeks from hatching. These sell at from 3s. to 6s. per pair. (W.A. breeders would like to get these prices.) White Leghorns, however, are of no use for ordinary broilers. But eggs for the table are considered the chief mode of profit, although 1,200 pullets were recently sold at 2½ dollars (10s.) each, and 140,000 eggs sold in a season for hatching. The expenses of running such a place are considerable, requiring the employment of eight men and a manager. The wages run from 10 to 22 dollars per month and board, and works out at a cost of 2s. per head of laying stock, inclusive of management, labour, book-keeping, teams, etc.

All plants are not a success. Mr. Brown mentions one which must have cost a lot of money, and although there was plenty of ground around the houses the birds were massed together in short single runs not exceeding 40 feet. Under those circumstances it is not surprising that this plant has never been a success, and that disease has broken out from time to time amongst the birds.

With reference to the trap-nest system, Mr. Brown made special enquiries into some, and comes to the following conclusions, viz., that if applied regardless of other considerations the result cannot fail to be disastrous, as the tendency will be to breed from birds which are good layers, disregarding their stamina, and as the latter is essential to large egg production, and even though the weaker bird may be prolific, yet the progeny would lose a good deal in this respect. The most elaborate arrangements for trap-nests were seen at the New York State Agricultural Experiment Station, where there is a special house for this purpose. Here the opinion held as a result of several years' experiments is that although trap nesting is a good system properly applied, it is believed that undue striving for eggs will defeat the object. Whilst in the hands of those who understand the



INDIAN RUNNER DRAKE

Bred and owned by Mr. Chas. W. Johnson, of Leederville. First time shown he won First and Special prize, Blue Ribbon and Championship.

principles which must be kept in view the system is an excellent one, it needs to be carefully applied.

Mr. Brown's remarks *re* cold storage of eggs are of particular interest. He says, "Within the last few years an enormous amount of capital has been invested in cold storage plants both for eggs and chickens, but the results have not been very satisfactory. Difficulties have arisen which were not anticipated. Storage eggs often show flavour of packing, and they must be consumed rapidly after they are taken out of storage, but the adoption of the system, even though it has not been profitable to speculators, has proved of advantage to poultry keepers, as the withdrawal from ordinary markets of vast quantities of eggs during the cheap periods of the year has steadied prices; in fact it is here we have the explanation as to why cold storage companies have lost money. If they could have maintained the old prices it would have been different."

So disappointing have been the results that Mr. Brown found a reaction taking place, and several of the leading traders, both in Canada and the West, declared their preference for the old system of pitching eggs, which, although it involves more trouble, yet the eggs come out better, and do not deteriorate so rapidly after marked.

A large trade is done in canned eggs. The eggs which by reason of small size do not come up to the standard weight, and the cracks, are broken by girls and packed in cases holding 20 lbs., in some cases the yolks and whites being separated. These are in large demand by biscuit makers and confectioners. But although some attempt has been made to ship them to England, that has not been successful, and the demand is largely at home.

Artificial incubation is conducted on a very large scale, much larger than is done in England. Incubators are as a rule kept in cellars, partly underground, but later experience, however, in America shows that a substantial building above ground yields as satisfactory results, as they can be ventilated with greater facility. The percentage of hatches of fertile eggs at the College Poultry Farm, Theale, during the last three years was 73.22, which is much higher than generally obtained. Mr. Brown states that, allowing for deaths, roughly speaking it may be said that it takes two eggs to produce one mature chicken.

Instruction in poultry keeping was first taken up in a systematic manner nine years ago at Rhode Island College. Since that time rapid progress has been made, and now nearly every agricultural teaching centre in the United States and Canada has a professor of, or instructor in, this subject, with a poultry plant for giving the necessary practice. Mr. Brown was most surprised to see how the poultry plants at the various colleges visited are crowded upon a limited area, when plenty of ground is available, but he says, "I am glad to know the fact is being realised, and that extensions are taking place or in contemplation. The same difficulty has been experienced in America as we have had to battle with in Britain, namely, convincing the powers that be of the importance and value of poultry keeping as a rural industry, greater than many others which they regard with more interest. A great change, however, is taking place in this respect.

Experimental work at the Agricultural Stations is an important feature, from which a great amount of knowledge and experience has been gained. In a new country, especially of wide extent and with greatly divergent conditions, experimental work is specially needed. But the scientific study of poultry keeping is of such recent date that there are a host of problems presenting themselves for solution in Europe as well as in America, and too much attention cannot be paid to research. There were in 1905 fifty-nine Experiment Stations in the States. In Canada there are five. Many of these are affiliated to Agricultural Colleges, but others are devoted entirely to experiments. The total expenditure on this section, in the States, exceeds one million dollars per annum.

With reference to turkeys, Mr. Brown gives us some rather surprising information, viz., that owing to disease, this branch of the industry is in a bad way, and to such an extent that in some districts the industry has been destroyed. In others great reductions have taken place; and there are many who at one time bred turkeys to a considerable extent but have had to seek other sources of income. This matter has reached so serious a position that Mr. Brown says that it is necessary to "*absolutely prohibit the importation of breeding turkeys from Canada and the United States until a clean bill of health can be shown.*" These remarks refer to Britain, but what applies to England also applies to any other part of the world. Therefore if there are any Australian breeders who are thinking of getting turkeys from America it would be wise of them to refrain from doing so. The disease, which is known as Black Head, is receiving exhaustive scientific investigation at one of the poultry colleges.

There are many other interesting matters dealt with in Mr. Brown's book, but time will not admit at present of further dealing with same in this issue.

EGG-LAYING COMPETITION.

AUGUST RESULTS AT SUBIACO.

In connection with the Subiaco Egg-Laying Competition the results for August were as follows:—

HENS.

	Aug.	Total.
J. Stuart, Golden Wyandotte	143	269
Mrs. H. M. Kelley, Golden Wyandotte	141	264
O K Poultry Yard, White Leghorn	141	257
L Dobson, Silver Wyandotte	132	251
A. H. Padman, White Leghorn	145	251
J and T. Robertson, White Leghorn	137	248
J. D. Wilson, Brown Leghorn	129	246
F. Mason, White Leghorn	127	242
A. F. Farrant, Buff Orpington	121	241
C. R. Herbert, White Leghorn	138	239
S. Craig, White Leghorn	130	238
Craig Bros., White Leghorn	137	236
Glendonald P.Y., Golden Wyandotte	159	233
North Lake Egg Farm, White Leghorn	125	228
Sunnyhurst, White Leghorn	150	228
O James, White Leghorn	140	227
A. F Farrant, Partridge Wyandotte	115	223
A. and G. Buttsworth, Black Orpington	116	223
Savage and Jones, White Leghorn	109	213
Coolgardie P.Y, White Leghorn	126	213
Perth P.Y., White Leghorn	115	212
Bassett and Titterton, White Leghorn	136	211
J. Stuart, Buff Orpington	132	208
J. Faulkner, White Leghorn	129	206

HENS—*continued.*

	Aug.	Total.
Mrs McGree, White Wyandotte	135	201
F. E. Tull, White Leghorn	114	199
Mrs. Hughes, White Leghorn	137	199
Jack R. Parkes, Brown Leghorn	104	198
C. Thomas, White Leghorn	106	196
Scottish-American, White Leghorn	115	196
Mrs. H. J. France, White Leghorn	135	195
Gus. George, White Leghorn	100	191
E. E. Ranford, Black Minorca	122	189
Austin and Thomas, White Leghorn	100	188
E. Krachler, R.C. Brown Leghorn	111	184
Master Staines, R.C. Brown Leghorn	126	184
White Wings P.Y., White Leghorn	76	182
A. F. Farrant, White Wyandotte	111	181
O.K. P Y., R.C. Brown Leghorn	112	178
C. W. Johnson, White Leghorn	111	176
G. M. Buttsworth, White Leghorn	125	176
Digby P.Y., Brown Leghorn	121	174
Sunnyhurst, Black Orpington	111	172
B. Tonkin, White Leghorn	101	169
R. A. Dusting, Black Minorca	118	169
Scottish-American, Brown Leghorn	102	168
J. Kirk, Silver Wyandotte	118	168
Adelaide P.Y., White Leghorn	97	164
J. Stuart, White Rocks	99	164
Buff P.Y., Buff Orpington	99	156
Adelaide P Y., R.C. Brown Leghorn	98	154
Thamar P.Y. White Leghorn	104	154
J. Stuart, Silver-pencilled Wyandotte	125	152
Mrs. H. M Kelley, White Leghorn	100	140
W. R. Read, Golden Wyandotte	89	138
L Despeissis, Houdan	73	137
G A Innes, White Leghorn	82	126
B. Jones, White Leghorn	100	116
Craig Bros , Black Orpington	80	103
Honnor and Forbes, Black Minorca	91	103
A. F Spencer, White Leghorn	62	89
D. Young, Black Orpington	73	87
Mrs. Byass, Salmon Faverolles	54	83
Non-competitive, crossbreds	62	62

DUCKS.

	Aug.	Total.
G. Thomson, Indian Runner	177	337
Mrs. H. J. France, Indian Runner	156	301
R. A. Dusting, Indian Runner	182	296
Scottish-American P.Y., Indian Runner	175	295
F. King, Indian Runner	174	283
Austin and Thomas, Indian Runner	137	256
C. W. Johnson, Indian Runner	136	241
A. J. Walters, Buff Orpington	135	228
White Wings P.Y., Buff Orpington	158	218
Adelaide P.Y., Indian Runner	160	207
South Perth P.Y. No. 2, Pekin	157	192
Mrs. Mellon, Indian Runner	137	181
M. Kynaston, Indian Runner	99	174
J. and T. Robertson, Indian Runner	117	171
D. F. Vincent, Indian Runner	109	158
S. A. McColl, Buff Orpington	127	138
Smith and Davenport, Indian Runner	129	129
E. Tremberth, Pekin	88	96
South Perth P.Y., No. 1, Pekin	68	68
North Lake Egg Farm, Indian Runner	58	58
T. Anderson, Indian Runner	32	43
Bon Accord, Buff Orpington	1	10

VEGETABLE GROWING.

By G. Chitty Baker.

Squash (Cucurbita melopepo).

The squash is closely related to the pumpkin and vegetable marrow, but sufficient difference exists as to make it a very welcome change. It is very hardy, and suits itself to most conditions. The preparation of the ground and cultivation are similar to that described for pumpkins. One of the best is the Hubbard.

Tomato (Lycopersicum esculentum).

Tomatoes are so well known, growing as they do with such luxuriance, that it is hardly necessary to go into details with regard to them. As early tomatoes, however, are always eagerly sought after, a few hints are here given as to the best manner in which to obtain the first fruits of the season.

Seed should be sown in pots early in May ; placed in a frame well protected from the weather, and kept growing. All laterals should be pinched off so soon as they make their appearance, allowing the main stem only to grow, or at the very most two laterals in addition to the main stem.

I am of opinion that when the ground can be obtained near a city or other good market, that it will well repay to erect glass houses for the early production of this and other crops. Although the initial cost is somewhat large, accruing profits are correspondingly great.

As spring advances the plants should be hardened off, taking care that they have sufficient room to grow, and not become pot-bound. With a little care and attention ripe fruit may be easily picked in October.

Seed may be sown in the open ground in August, continuing up to November. Plants require rich ground, well worked, with liberal additions of nitrogen and potash.

Watering.—Too much water is as fatal to tomatoes as too little Surface watering is also detrimental to good growth. The best way is to apply the water by the aid of furrows or sub-irrigation. Where a few plants only are grown, it will be found a great advantage to sink a four-inch ordinary agriculture drain pipe in the ground so that one end of it is level with the surface, and water the plant by this means. By using a pipe the water is conveyed to at least a foot below the surface. Not only will this place the water where it is most required, but by keeping the subsoil moist the roots are induced to go down for the moisture, which they will do, and so by reason of being beyond the reach of the heat of the sun they will not suffer from its drying effects, and consequently the plant will thrive the better for this treatment.

There are such a number of varieties to choose from that a grower must be very fastidious if he is unable to get one or more that will please him. Of the early sorts, Earliana, Edward VII., and Carter's Sunrise may be considered of the best.

Turnip (Brassica rapa).

Turnips to be tender and mild should be grown quickly, not allowing the growth to be checked. The seed may be sown either broadcast or in drills. The latter way is the best for early sorts. The first sowings may be made in March, or earlier where the ground is moist, continuing right up to early summer. For autumn and spring sowings the white sorts will be found the best; the yellow-fleshed varieties for spring and early summer, as these stand the heat so much better.

Vegetable Marrow (*Cucurbita pepo ovifera*).

The vegetable marrow is not grown to the extent that its many good qualities deserve. It is a far more delicate table vegetable than the pumpkin or squash. It is easy of cultivation and prolific in its bearing. It may be cultivated the same as the cucumber, but given a little more room. The bush varieties, however, may be grown about six feet apart, while the running kinds should not be allowed to grow closer than eight feet. There are many goods sorts to grow of the bush varieties, the "Custard" is one of the best, whilst "Riee," "Long White" and "Turkish Honey" of the running kinds will all be found to be good.

Herbs.

No garden is complete without its herb bed. Thyme, Marjoram, Mint, and Sage should always find a place ; space might also be made for several others of these useful plants, such as Rice, Savory, Lavender, and Hyssop. Plants of most of these can be obtained from local seedsmen, when they can afterwards be subdivided and increased.

GARDEN PESTS, AND HOW TO TREAT THEM.

A list of a few of the pests troubling vegetable growers are here given with the remedies to apply :—

Bean Anthracnose.—Colletotrichum lindemuthianum (*Sacc. and Magn*).

This disease, caused by the above fungus, levies a heavy tax on all bean crops. The affected plants may be entirely destroyed, or they are so affected, that an inferior crop results. All parts of the bean plant are affected.

If diseased seeds are planted, the infection may be often noticed on the seed leaves (*cotyledons*). soon after they appear above ground, or it attacks the stem, eating through it, and causing the affected plant to collapse as if it had been eaten through by cutworms. At this stage, a considerable proportion of the plants are destroyed, the stems assuming a dark colour and perishing. Small sunken pustules are seen on it.

Many of those plants which have survived the earlier attacks of the fungus now fall a prey to it, the leaves and the leaflets becoming spotted and pitted, and the yield being greatly reduced in consequence.

In the next stage the pods are attacked and show black or brown pustules with red borders.

Cabbage Aphis (*Aphis brassicae, Linn.*)

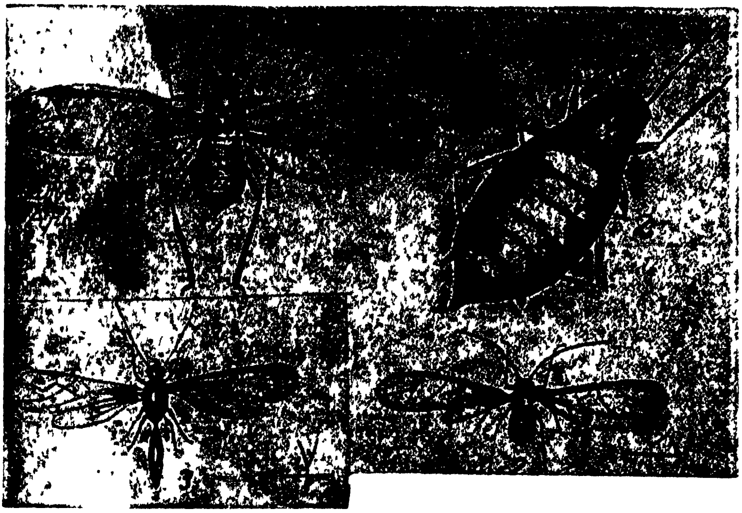
There are several modes of dealing with this pest, and among them the best are to spray with Tar Water, Kerosene Emulsion, Quassia Chips or Tobacco, the formulas for which will be found at the end of the article.

A number of Aphis-feeding ladybirds have been introduced which prey upon this Aphis, as well as four species of Ichneumon Flies from New South Wales, Ceylon, and India, all of which have contributed to materially reduce this pest, and they will, when thoroughly established, hold the pest in subjection.

Bean Anthracnose on Pods (*Agricultural Gazette N.S.W.*).

Cabbage Moths.

The larvae of two kinds of moths are, says Mr. Lea, late Entomologist to the Department of Agriculture, very destructive to the cabbage and turnip. These are the cabbage or diamond-back moth (*Plutella cruciferarum*) and the stinking-head moth (*Evergestis rimosalis*). Articles or notes upon both these moths have several times appeared in the *Journal.*



Cabbage Aphis (*Aphis brassicæ*) 1, winged female; 2, winged male; 2, showing hole in back made by 3, Ichneumon fly

Plutella Cruciferum (*Zell*).—The larvae of this little moth (which is common all over the world) are very destructive to the cabbage, cauliflower, and turnip. The leaves have small holes eaten in them, and these holes are frequently so numerous that more than half the leaf is devoured; with cabbages, the inner leaves are seldom attacked, though larvae may occasionally be seen in the heart itself, the damage is usually to the outer leaves; with cauliflower every leaf is attacked and the crown is frequently covered with excrement and web, becomes of a brown colour, and is totally unfit for market; hundreds of larvae and pupae may be seen on one plant. The larva is pale green in colour, and, on being touched, jerks itself about and drops down, usually by a fine silken thread; when about to pupate it spins a loose silken cocoon generally close to the mid-rib, the cocoon is so slight that the pupa can always be seen through it. The moth is a small slatey-grey insect with diamond-shaped white marks along the middle of the folded wings; it is readily attracted to light. All over Australia the larvae are very severely parasitised by a small Ichneumon, and so numerous are specimens of this insect that it is doubtful if 20 per cent. of *Plutella* larvæ ever become moths. The larva of the parasite is a small legless maggot which, when full-fed, constructs a small cocoon within that of the larva it has destroyed. The larvæ of *Plutella* have numerous other enemies, amongst which may be mentioned two species of Syrphus flies, two Chalcids, and several predaceous bugs.

During the past two years several additional species of parasites have been introduced into this State.

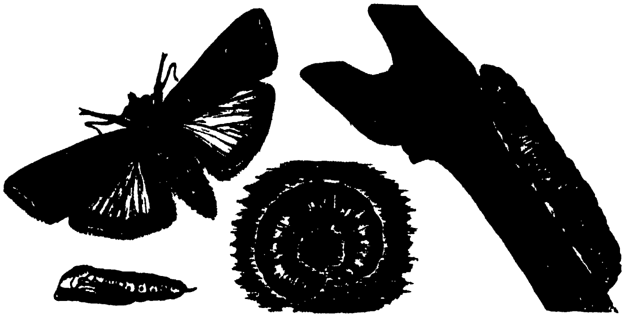
Another species of moth which is likely (*Evergestis rimosalis*), the larvæ of which does much damage to cabbage and cauliflower and also turnips, is also found in this State. The moth is a pretty yellow, with the front wings irregularly spotted and striped with chocolate and paler yellow markings. No parasites have been bred from the larvæ.

Remedy.—Spray with Paris Green or Tar Water.

Cut Worms.

Everyone who has done any gardening has been much put out by the ravages of the cut-worm. These pests seem to have a very varied taste, eating any and every kind of plant growing in the garden, the tops of tomatoes, potatoes, seedlings of all kinds, vine and fruit tree shoots, nothing comes amiss.

Cut worms are the larvæ or grubs of moths (says Mr. Lea) belonging to the family *Noctuidoe,* and they are especially destructive during the night, in the day remaining concealed just under the surface of the ground, or under logs, rubbish, etc. There are numerous kinds in this State, some of which are peculiar to it, and others are almost world-wide in their distribution. The accompanying illustration (by Mr. Claude Fuller) shows one of the most common and destructive species, in its various stages. The larvæ, as evening approaches, remove themselves from the soil and crawl up the nearest plant, eating small pieces of bark as they proceed ; they eat parts of the buds, and cause distorted growth, or perhaps entirely destroy the young shoot ; leaves are also attacked, but the grubs appear to prefer the soft young bark and buds. Mr. M. H. Jacoby, of Mundaring, in a letter referring to the insect, says :—"It is doing considerable damage to white grapes in this district, especially muscatels, by eating and cutting off the berries just after setting. I thought at first that the shower of berries lying on the ground was caused by abortive setting, but upon examination after dark found the grub feeding upon the young bunch. In many cases they have cut portions of the bunches right off." Besides the vine this insect attacks the apple, quinch, peach, and many other fruit grasses and wild plants ; sometimes a plant is entirely denuded of its leaves, or left with a few stalks and fragments of leaves. A tree or vine is occasionally practically ring-barked from the numerous patches that have been eaten.



The larvæ is thick and fleshy, and larger near the head than towards the tail. On being touched it curls itself up and feigns death ; after a short period it straightens itself, and moves along by contracting the high segments and elongating the front ones, the motion being somewhat jerky. It is of a dirty sandy brown colour, with a feeble stripe running along the back, and

Mr E Warburton's Homestead, Mt Barker District

two still more feeble ones at the sides ; the head is shining, the under-surface is of a dirty grey colour, and paler than above. There are five pairs of prolegs placed on the apical segments ; the breathing holes (or spiracles) at the sides are small, black, and distinct. The body is almost without hairs, a few short ones being situate near the anus and on the sides. The excrement is black. In captivity the larvæ will frequently devour one another, even when supplied with an abundance of food. The pupæ are pale brown in colour, with a small spine at the end ; they are usually to be found in the situation as the larvæ, and are usually (but not always) enclosed in a small silken cocoon, which is generally densely covered with sand and easily broken ; around the wall of the residence on Rottnest Island, I noticed that cocoons of this species were clustered in lumps of from five to 20 ; they broke to pieces almost at a touch and the enclosed pupæ fell out. The moth itself measures about an inch across the expanded wings, the front ones are pale brown in colour, and mottled with darker brown and grey, the hind wings are almost white, with brown shadings towards the edges, the ribs (or veins) are brown, and the outer fringe of hairs is white. The egg is small, clustered on the bark; sometimes they are laid in rows, or occasionally scattered here and there.

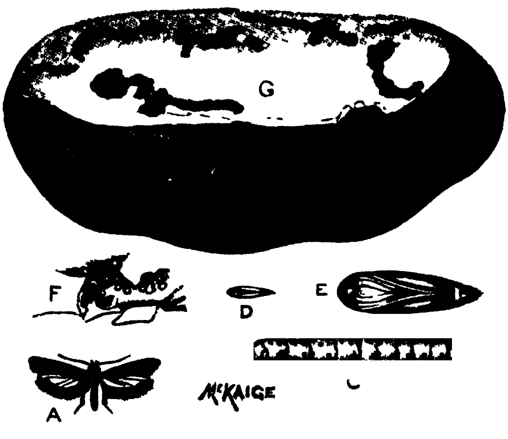
There are several parasites that destroy the larvæ, the most plentiful being a moderately large Chalcid wasp, there are also two species of Ichneumon, and several flies.

Remedy.—The best means of treating this pest is by laying baits, and spraying with Paris Green, formulas for which are given at the end of this article.

POTATO DISEASES.

Potato Moth (*Lita Solanella,* Boisd.).

Mr. A. M. Lea, writing of this pest in the *Agricultural Journal*, August 1895, says, that this is perhaps the worst insect pest the potato-growers have to contend against, and says, where in numbers, it will not infrequently destroy almost the entire crop, its tunnels filled with excrement going through the tubers in all directions and rendering them unfit for human consumption; it also attacks and does very considerable damage to the leaves of tobacco, and is occasionally seen in tomatoes.



Seed potatoes often suffer very severely, the larvæ bore their way into the eyes and entirely destroy their germinating power. It is not only that the tubers are attacked, the larvæ preferring the leaves to the tubers, as where the tubers have been accidentally exposed had been seldom found to be attacked, whilst the leaves were swarming with the larvæ. When the tops die off or are cut down by frosts, however, a change takes place, as the larvæ desert the leaves in large numbers and wander about the fields, entering any tubers they may come across, even entering frostbitten ones. In captivity they will even attack fresh leaves in preference to the tubers.

When depositing her eggs on growing plants the moth usually places them close together on the inner side of a leaf, close to the main or one of the smaller ribs; the larvæ, on hatching, immediately eats its way into the leaf, hollowing it out in patches, and leaving only the skins of the leaf, which then presents a patchy appearance; the larvæ will often leave one part of a leaf to go to another, and it is in eating their way in that numbers may be poisoned.

The larvæ is a small, pale, dirty-green caterpillar, with a brown head, and when full grown is about half an inch in length. The pupa or chrysalis is pale-brown in colour, and is enclosed in a small silken cocoon, which is nearly always covered with dirt. The moth itself is a small grey insect (the front wings darker than the hind ones) a little more than half an inch across the expanded wings.

Remedy.—Sprinkle with Paris Green and store underground.

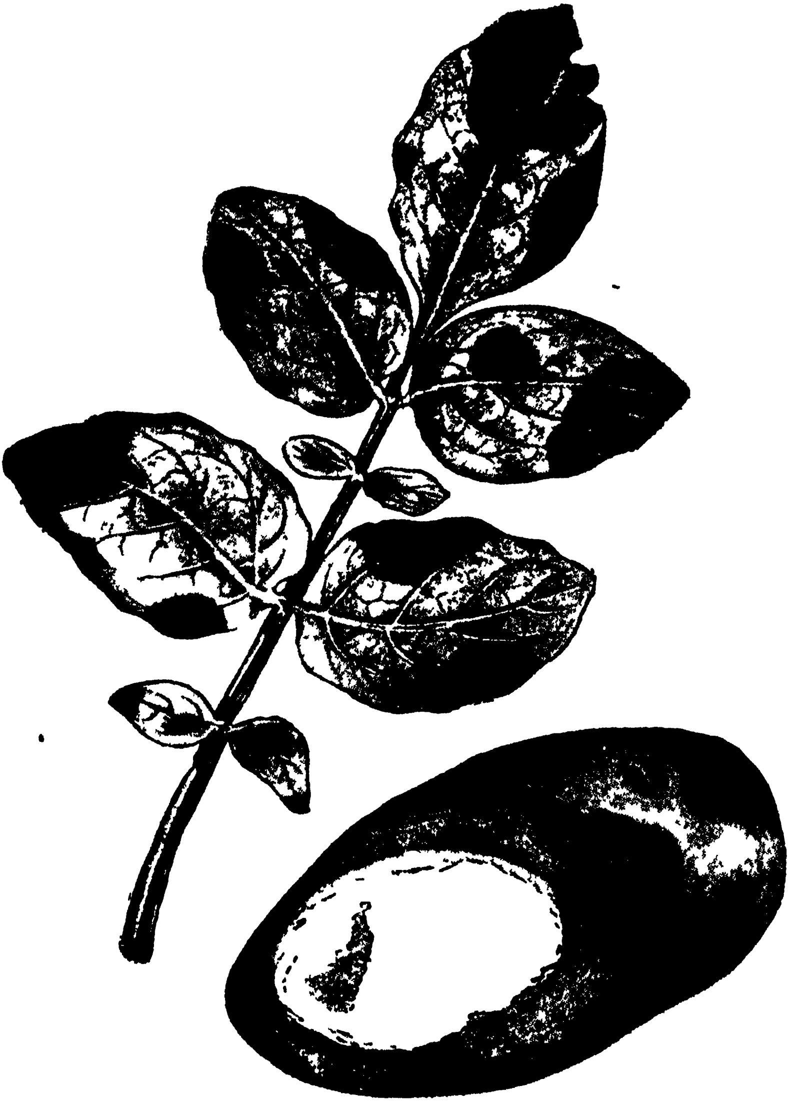
Potato Blight.

The first sign of the disease is the presence of yellowish spots on the leaves ; the spots increase in size and become brown ; this is followed by curling of the leaves. If the undersurface of a diseased leaf is examined with a magnifying glass, the fruiting branches of the *fungus* will be seen forming a delicate white "mould." The "spores" of the *fungus* are very minute, and are scattered by wind, rain, and the movements of animals. Every "spore" brought into contact with a damp potato leaf is capable of starting a new centre of infection. The disease spreads rapidly, especially under conditions of damp and warmth combined. "Spores" that fall to the ground are washed by rain through the soil and infect the young tubers. The *mycelium* or *spawn* (vegetative portion) of the *fungus* also passed down diseased stems into the young tubers. If the season is wet and warm, the *mycelium* continues to grow, causing brown spots to appear, ending in rotting of the tubers. (*See* illustration.)

Prevention and Treatment.—The disease is propagated and carried on from season to season in the seed potatoes. "Seed" from diseased crops should not be saved. Diseased haulms and tubers should be burned on the ground without removal. Varieties long in continuous cultivation easily contract disease. Frequent change of "seed" should be secured. Rows of growing potatoes should be well earthed up to protect the tubers from infection by "spores." The season, wet or dry, should be ignored, and systematic spraying with "Bordeaux" or "Burgundy" mixture, especially for the main crop varieties.

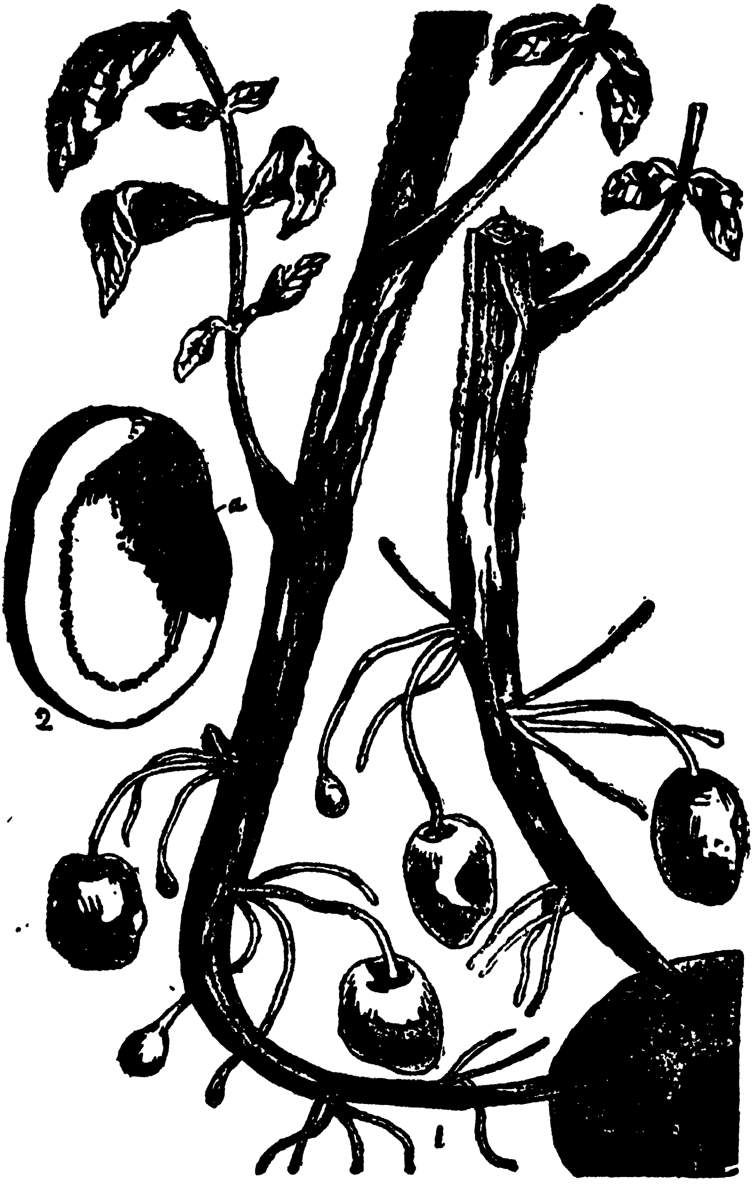
Black Leg, or Potato Stem Rot.—This is a very destructive disease, The leaves wilt and turn yellow ; they then become shrivelled from below upwards, and finally die. The stem becomes black and rotten throughout. The disease is caused, primarily, by a *bacterium*, but, as decay proceeds, various kinds of *fungi* assist in the completion of the work. This disease also spreads with greatest rapidity in warm, moist conditions.

The death of the haulm at an early period, especially in the case of the late varieties, means almost total loss, as the tubers become infected by the *bacteria* that pass into the soil from the rotten haulm (*See* illustration.)



Potato Blight (*Phytophthora infestans*) Diseased leaf and tuber of potato

Prevention and Treatment.—All root crops, as well as potatoes, are liable to this disease, and should not be cultivated for two years on land where disease has occurred. All infected plants and tubers should be burned. Cereals are not affected, and they should be used as rotation crops. Whole "sets" should be planted, and new "seed" used. Lime and strong nitrogenous manures should be avoided; spraying with "Bordeaux" or "Burgundy" mixture is of benefit.



Black-leg or Potato Stem Rot (caused by *bacillus Phytophthorus*). (1) Showing disease in different stages of development on the haulm. (2) A diseased tuber, the bacteria having entered through a minute wound at *a*.

Wet Rot.

In damp, warm seasons, the tubers underground may suffer from this malady, which also affects potatoes stored in pits or sheds in which dark, damp, and warm conditions prevail. The disease begins with the formation of dark patches beneath the skin of the potato, and the whole interior soon becomes affected by a brown, slimy "wet rot." It is difficult to detect this disease without cutting open the tuber, but the evidence of disease, in the interior, cannot be mistaken. "Seed" derived from crops known to have suffered from "wet rot" should not be used. The disease, of which there are several forms, is of *bacterial* origin. It is increased, subsequently, by the attacks of various *fungi* upon the weakened tissue. Suspected tubers should be soaked in a weak solution of "Bordeaux" mixture for an hour, then well dried, dusted with sulphur, and stored in the approved manner already described. "Seed" showing disease should be destroyed.

FIG. 1.

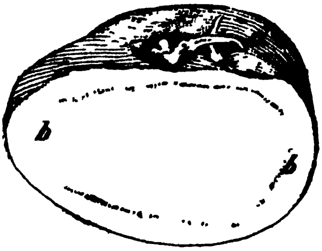


FIG. 2.

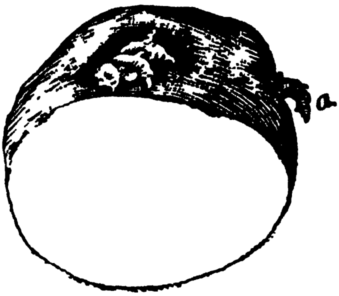


FIG. 1.—The sprouting of a potato suffering from the initial stages of "wet rot." *a*, sprouts; *bb*, indications of the "wet rot."
The sprouts are weak and spindling. Compare with the adjacent illustration.

FIG 2.—The sprouting of a healthy potato. To be compared with Fig. 4. *aa*, Sprouts.

"Seed" should be treated with sulphur, after being thoroughly dried, and stored under healthy conditions. All diseased potatoes should be burned. Even if fed to pigs—unless the tubers are previously boiled—the "spores" will certainly be returned to the land.

Common Scab.

This *fungus* usually attacks the tubers while young; the patches of disease increase in size and number, and, not infrequently, when the tuber is full grown its surface is, more or less, completely covered with "scab" The injury is confined to the surface of the tuber, and the quality of the potato is not seriously impaired for eating. The market value, however, is much lowered. Scabbed potatoes should not be used for "seed," unless they are sterilised, or the disease will pass into the soil, and be difficult to destroy. Before planting, the "seed" should be immersed in a weak "Bordeaux" or "Burgundy" mixture, or a Formaldehyde solution (1 in 300) for an hour, spread out until quite dry, and then planted. The sulphur treatment should be applied to "seed" before storing. Strong nitrogenous manures must be avoided.

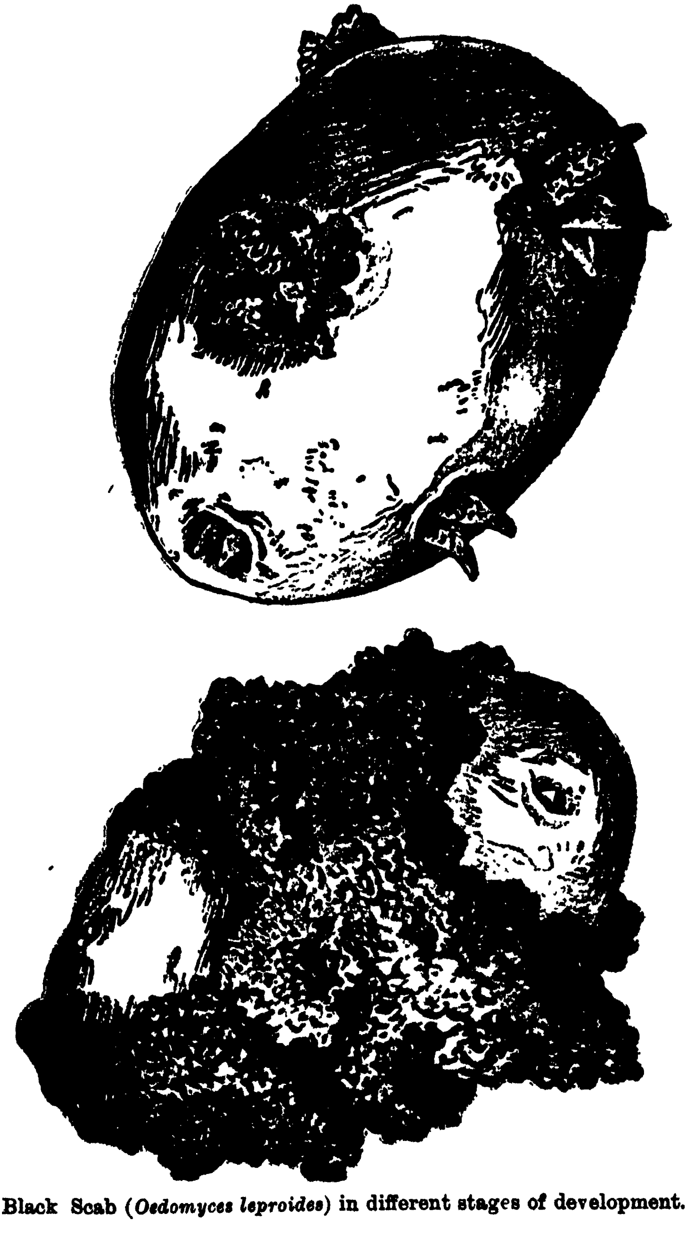
Peelings of, and badly infested, tubers should be boiled before being fed to pigs. Preferably, however, all diseased matter should be burned. (*See* illustration.)

Common Potato Scab (*Oospora scabies*).

Black Scab.

The tubers become infected, mainly through the "eyes," about which there is a formation of outgrowths having the appearance of warts and wrinkles. If infected at several points, the entire surface of the tuber may be covered with a rugged "black scab." The earliest symptom of the presence of "black scab," is the brown colour and wrinkled appearance of the very young shoots. If "seed" tubers are stored in the approved manner they may always be detected, and necessary precautions taken to check the disease.

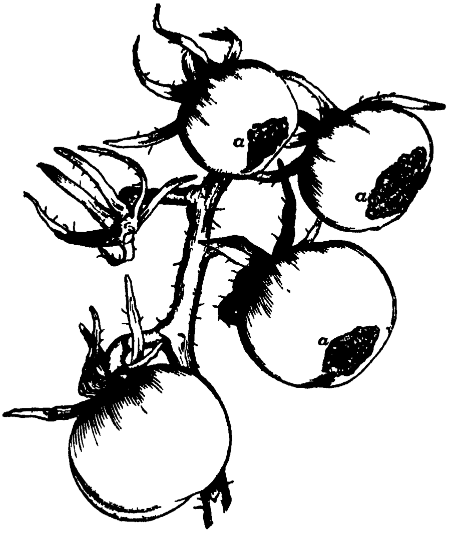
If sound potatoes are planted in infected soil, a similar condition occurs; the young sprouts become attacked, and converted into rugged masses which check all growth. The *fungus* survives in the soil for about two years. Rotation, therefore, must be practised. Most root crops, especially the *beet* family, are attacked, but cereals are exempt. (*See* ilustration.)



Black Scab (*Oedomyces leproides*) in different stages of development.

TOMATO DISEASES.

Black Rot (Macrosporium Tomato, Cooke).

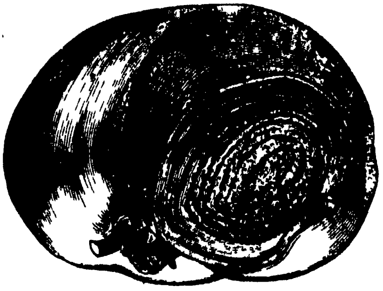


Black Rot of the Tomato (*Macrosporium tomato*). The rot seen at *a* the blossom end. The lowest tomato not yet attacked.—(*Agricultural Gazette*, New South Wales.)

The rotting of the nearly grown, or ripe tomato. Dull dark green spots of a velvety appearance show at first. These slowly enlarge, and the tomato rots entirely. The fungus is a wound parasite, gaining entrance into the ripening fruit through minute cracks. It feeds on the tissues under the skin, thus causing a little sinking below the surface of the healthy part of the fruit. Green stable manure is said to favour the disease, causing the fruit to crack. Spraying with Bordeaux or Burgundy mixture keeps the disease in check.

Ripe Rot (Gloesporium fructigenum, Berk.)

Commonly known as Ripe Rot, and often destructive to ripe apples, pears, peaches, and grapes. Concentric markings with no velvety appearance as in the case of Black Rot, distinguish this disease, the skin remaining for some time glossy, though discoloured ; the attacked area is flattened. When the pustules break out the spores give to the surface a grandular appearance.



Ripe Rot (*Glæosporium fructigenum*, Berk). *Agricultural Gazette*, New South Wales.

Preventive. — The small cherry and plum tomato are not attacked. Training the vine on stakes or trellis, so as to give the fruit plenty of light and air, is usually useful, as the Black Rot is more active in a damp atmosphere and near the ground. Burn diseased fruit and vines. Drain if necessary. Never use seeds from diseased tomatoes. Alternate crops.

Remedy.—Spray the young vines with Bordeaux or Burgundy mixture or sulphide of potassium, and then periodically every few weeks—especially the young fruit.

Leaf Rust (Cladosporium fulvum, Cooke).

This disease spreads with great rapidity. It is caused by a fungus which forms rusty brown patches on the under-side of the leaves. These patches consist of closely packed clusters of coloured conidiophores. As these patches spread the leaf becomes yellow and wilted, the margins curl, and the leaves shrivel and die. Bad drainage and moist situations favour the growth of the fungus, which requires plenty of moisture. Trellising, by lifting up the plants into a drier atmosphere, lessens the liability of attack. Spraying with Bordeaux or Burgundy mixture or with sulphide of potassium (liver of sulphur) will hold the disease in check.

Tomato Wilt.

This trouble is caused by two different agents, viz., a fungus (*Fusarium lycopersici, sacc.*) and a bacilus (*Bacillus Solanacearum*). The symptoms of both diseases are much alike. The first, which is known in the Channel Islands as the "sleeping disease," at times causes great damage. This disease is indicated by the drooping of the leaves, followed by that of the plant, hence the name given to it. If the plants are only attacked when the fruits are green, these ripen and there is nothing in their appearance to show that they are in any way infected. The fungus gains access to the plant through the rootlets and gradually extends to the tap root and lower portion of the stem. When it gets this far, a brown discoloration of the vascular bundles takes place, and the plant droops or "sleeps." Shortly after this stage, says Prosser, the portion of the stem just above ground is more or less covered with a very delicate white mould which consists of fruiting branches or conidiophores, which bear conidia at the tips. These conidia fall to the ground and there germinate, producing a mycelium, which attacks the rootlets of tomatoes, potatoes, egg fruit, and plants of that family. Owing to the mode of attack, spraying with fungicides is of liitle use. Rotation of crops minimises the trouble, liming of the soil is recommended, and above all, seeds from fruit ripening on diseased plants should not be used.

The bacterial disease of the Solanaceæ is very similar to the previous one. The foliage first wilts, then the plant collapses—wilts and dies without sign of disease upon it. As the germs are in the circulation and not outside, no external treatment is of any avail. A section of a diseased branch discloses a brown discoloration of the woody cylinder, and from the vessels ooze out yellowish drops carrying the bacteria.

The disease is propagated by inoculation, generally by nibbling insects, whereas in the previous disease the fungus cannot be inoculated on the stem or the leaves, and only enters the plant through the rootlets. In the case of the bacterial disease, spray with Paris green to check leaf eating and leaf-puncturing insects. Root up and burn all infected plants; do not plant solanaceous plants in quick rotation on the same ground.

Quite lately Delacroix has described an organism connected with the disease in question, to which the name B. solannicola is given. The organism is believed to be present in the soil, from which it spreads to the plants, and unfavourable meterological conditions are said to aggravate the infection. Associated with it is a soil fungus, *Rhizoctonia solani*, which is an active parasite of the potato and the tomato plants.

REMEDIES FOR GARDEN PESTS.

No. 1.—*Bordeaux Mixture (Full Strength for Winter Spraying).*

Sulphate of Copper (bluestone)	4lbs.
Quicklime (to be freely slaked)	4lbs.
Water	22gals.

(*a.*) Dissolve the bluestone in 10 gallons of water by placing it in a sack suspended in the water and moving the sack about, when the sulphate will quickly dissolve. (*b.*) Make a whitewash with the lime, strain to separate the grit, and bring the milk of lime to 10 gallons. Mix *a* and *b* and make up to 22 gallons. Use only wooden or earthenware vessels. When the foliage is out, use the half-strength mixture by diluting in double the volume of water. To determine if the mixture is safe to use on tender foliage, insert a new nail or the blade of a penknife for at least half a minute; if copper is deposited on the steel, lime must be added.

No. 2.—Bordeaux Mixture (Modified).

The same with 4lb. molasses added.

No. 3.

The same as Nos. 1 and 2, with 44 gallons water. Half strength for tender foliage.

BURGUNDY MIXTURE.

Sulphate of Copper (Bluestone)	4lbs.
Carbonate of Soda (common Washing Soda)	5lbs.
Water	22gals.

Dissolve each chemical separately in one gallon of warm water, when cool pour the soda solution gradually into 20 gallons of water, stirring all the while. To this add very slowly the copper solution, continuing to stir without stopping until the whole is thoroughly mixed.

In all cases where Bordeaux mixture is recommended, Burgundy mixture may be used instead. It will be found much easier to mix, and smaller quantities can be prepared more accurately. If only a little is required the following proportions will be found correct:—

Bluestone	1oz.
Soda	1¼oz.
Water	2 quarts.

BAIT.

Bran	10lbs.
Paris Green	4ozs.
Molasses	4lbs.

Worked with water to the consistency of stiff dough into balls, and laid at the foot of the plants for cut worms and grasshoppers.

Fresh leaves of vegetables, sprinkled with Paris green and water, laid about also makes a good bait.

TAR WATER.

Boiling Water	2gals.
Coal Tar	1lb.

Add tar, drop by drop, to boiling water, and stir violently. If the tar is added in bulk it will not mix. When dissolved, make up to 100 gallons with water. Spray under as well as upper surface of leaves.

WHALE OIL SOAP.

One pound to two to four gallons water for scale insects; 1lb. to four to six gallons for mealy bugs, aphides, red spider, etc. Good's No. 3 potash soap, one of the best, made of fish oil, and not more than 25 to 28 per cent. water.

KEROSENE EMULSION.

Kerosene	2gals.
Soap	½lb.

Boil the soap in one gallon of water. When boiling remove to another vessel, add the kerosene and churn violently for 10 minutes, or pour with a fall from one bucket into another until the whole forms a creamy mass which thickens on cooling. Will keep. When used, to one part of the emulsion add eight to ten parts of water, according to season. The time required to effect a complete emulsion will depend on the violence of the churning and the temperature of the mixture.

QUASSIA CHIPS AND WHALE OIL SOAP.

Quassia Chips	1lb.
Water	1gal.
Whale Oil Soap	½lb.

Boil the quassia chips and water for half-an-hour, then stir in the whale oil soap. When using dilute with 10 gallons of water.

TOBACCO DECOCTION.

Home Grown Tobacco, Leaf and Stem, or Tobacco Waste	1lb.
Water	6gals.

Steep the tobacco in the soap in water, strain, and use in two applications at three or four days' interval.

POISON SPRAY FOR CATERPILLARS AND ALL LEAF-EATING INSECTS.

Paris Green	4oz.
Water	50gals.

or 1oz. to 12 gallons. The addition of a little lime will neutralise the caustic property of the arsenic. A little glue or flour will ensure its adhesion to the leaves. To mix well, first make into a thin paste with a little water.

STATE FARM, HAMEL.

REPORT ON MAIZE.

By G. F. Berthoud.

To obtain profitable results this summer crop requires to be grown on good, moist land, deeply tilled, and well manured. Apply complete fertilizer or fine bonedust at the rate of 6 cwts. per acre, well worked into the soil, before or when sowing the seed. When grown for grain, the best returns are usually obtained from seed sown in rows about 4 feet apart, and the plants 18 inches along the row. All suckers should be taken off and fed to stock, allowing only one stalk to grow, this will produce one or two large and well filled cobs. When grown for green fodder only, the drills may be much closer together, or else the seed can be sown broadcast.

Varieties.

On good moist land in warm districts, the Dent sorts are the most prolific and profitable to cultivate. In places where the seasons are short or the soil less fertile, Flint varieties mature quicker, are more hardy, and will give better results than the others. Below are the yields of 12 new and select yellow sorts grown here during the past season. The summer was very dry, and unfavourable to this crop.

Seed

saved from selected cobs is now ready for distribution, in small trial lots, to farmers and others who may desire to experiment.

Maize—Flint Varieties.

"Golden Nugget."—American seed, sown 31st December. Growth fairly good; stalks fall over badly; height, to 7 feet. Ripe early in April. Cobs long, and fairly well filled with very large yellow grains. New and distinct variety. Yield, rate of 45 bushels per acre.

"Farmer's Friend."—American seed, sown 31st December. Growth dwarf; stools out freely; height, to 6 feet; stands up well. Ripe early in April. Cobs short but well filled. An early variety. Yield, rate of 34 bushels per acre.

"Nelson's Yellow."—American seed, sown 31st December. Dwarf growth, to 6 feet high; stands up well. Ripe early in April. Cobs medium size, well filled. New early variety. Yield, rate of 40 bushels per acre.

"Yardstick."—American seed, sown 31st December. Growth dwarf to 6 feet high; stands up well. Ripe early in April. Cobs slender and very long, closely filled with medium-sized grain. An early variety. Yield, rate of 42 bushels per acre.

"Ninety Day."—Sown 31st December. This is the common variety of Flint maize, usually grown in this State. Growth very good; stools well; height to 8 feet. Ripe end of April. Cobs of fair size, rather unevenly filled. Yield, rate of 28 bushels per acre.

Maize—Dent Varieties.

"Kansas 4568."—Sown 3rd December. Very vigorous grower; stalks to 9 feet, which are strong and stand up well. Prolific but late sort; requires good moist soil and a long season to mature properly. Ripe end of April. Cobs large, and well filled with deep grain. Yield rate of 86 bushels per acre.

"Old Gold."—Sown 31st December. Growth good; stands up fairly well; height to 9 feet. Ripe middle April. Cobs large, and well filled. Main crop. Yield rate of 57 bushels per acre.

"Reid's Yellow."—Sown 22nd December. Growth good; stalks to 8 feet high; stands up well. Ripe middle of April. Cobs medium size, and well filled. Yield rate of 43 bushels per acre.

"Funk's Yellow."—Sown 31st December. Growth good; stalks 8 feet high; fairly even. Ripe middle April. Cobs well filled. Nice yellow grain. Yield rate of 57 bushels per acre.

"White Cap Yellow."—American seed, sown 15th December. Growth fair; stalks to 8 feet high; rather weak, and liable to fall over. Ripe early in April. Cobs well filled; grain yellow, tipped white. Fair variety. Yield rate of 54 bushels per acre.

"Funk's Ninety Day."—Sown 12th December. Growth vigorous; stalks to 9 feet high; stands up well. Ripe end of March. Cobs of medium size, well filled. Yield rate of 54 bushels per acre.

"Pride of the North."—Sown 8th December. Growth good; stalks 6 feet high, fairly even; stands up well. Ripe early in March. Cobs small, but closely filled. This is the earliest to ripen in this class. Yield rate of 37 bushels per acre.

Peanut (Arachis hypogœa).

The low-lying peaty land on this farm is very deficient in lime, which is a serious drawback to the profitable culture of this plant. Although the plants make fair growth, and produce their underground pods freely, a large percentage of these are empty, or badly filled; the husks are also rather dark in colour. Sandy limestone soil is the best for this crop, the pods are then cleaner and brighter in colour, and the nuts more plump. Given congenial soil, this crop is easily grown, and should prove to be remunerative for the grower. Trial packets of sound, selected seed can now be supplied to anyone desirous of testing them. Plant in late spring, when the weather becomes warm and settled.

The soil should be clean, and deeply worked.

Fertiliser.—Superphosphate is one of the best for this crop, and should be applied broadcast and harrowed in at the rate of 6 cwts. per acre. Plant the seed about one inch deep, and 18 inches along the rows, which should be three feet apart.

Varieties.

The four sorts named below were all grown from imported seed:—

"Barbadoe."—Planted 19th October. Germination and growth good. Habit trailing; foliage wide and healthy, plants cover a space of 4 feet in diameter, and fairly even. Ripe in June. Prolific variety. Yield per acre, 238 bushels.

"Early Sweet."—American variety, planted 19th October. Habit upright; height one foot, covering a space of about 2 feet. Neat and compact growth; foliage large and distinct. Nuts hang closely round the stem. Ripe in June. Yield light. Yield per acre, 128 bushels.

"Mauritius."—Planted 19th October. Growth good; foliage small, stems small; plant covers a space about 30 inches in diameter. Ripe early in June. Yield per acre, 100 bushels.

"Tanjore."—Planted 19th October. Growth healthy and good; foliage large, dark green. Plant covers a space of from 3 to 4 feet in diameter. Ripe in June. Yield good, at the rate of 183 bushels per acre.

N.B.—A bushel of peanuts is equal to 24 lbs. or thereabouts.

Maize (60 varieties).—This crop does well on suitable lowland. Yield: highest 81 bushels, lowest 17 bushels; average 50 bushels per acre.

Field Peas (5 varieties).—The best are "Grey" and "White Chilian." Yield to 27 bushels per acre.

Cow Peas (6 varieties).—"Black" and "Iron" are the best. Yield good return of greenstuff during summer months.

Fodder Plants (15 sorts), comprising millets, sorghum, etc., for summer forage.—Yield on lowland without irrigation, up to 15 tons of green forage per acre.

Rice (6 varieties).—Italian "Bertone" and Egyptian "Yamani" are the best. Yield to 900 lbs. of grain in the husk per acre.

Cotton.—27 varieties have been tested. Of these the early American sorts, such as "Louisiana Prolific," are the only kinds which mature in this locality. Yield to 300 lbs. of lint per acre.

Potatoes.—100 sorts new and old, tested with fair results. Yields: highest 12 tons, lowest 2; average 5 tons per acre. The moist low lands are well adapted to this crop, and two fair crops can be grown annually.

New seedlings.—2,000 have been raised, from which several of the most promising are now being propagated.

Sweet Potatoes.—Seven varieties grown. Of these the Yellow Spanish is the best all round sort. Yield: highest 17 tons, lowest 7; average 12 tons per acre. Very useful crop for stock feeding.

Permanent Grasses.—About 160 kinds have been tested, with fair results. Of English grasses the best are "Tall Fescue" and "Cocksfoot."

Clovers.—White Dutch and Alsyke are good on low lands.

High lands.—White Bokhara clover and Sheeps Burnet are useful.

Paspalum, Rhodes grass, Phalaris, and Panicum also give very good results.

Several promising indigenous grasses are under trial culture.

Experimental work has been carried on here for ten years. During above period considerable time has been devoted to selecting and breeding up new varieties of cereals and potatoes.

Wheat.—200 kinds, including crossbreds, were grown. Yields have varied greatly according to variety and climatic conditions. Yields from 4 to 40 bushels per acre. Under ordinary conditions an average of 12 bushels is usually obtained.

Oats.—70 varieties successfully grown. Yields 10 to 40 bushels; average 20 bushels per acre. The Calcutta and Algerian the best for hay. Yield to 2 tons per acre.

Barley (40 sorts).—Soil on this farm unsuitable for this crop. Yields: highest 23 bushels, lowest 8; average 16 bushels per acre.

Rye.—20 varieties tested. "Markisoher" and Summer Saxon are the best, producing good tall straw and heavy grain. Yield: highest 18 bushels, lowest 8; average 13 bushels per acre.

NARROGIN STATE FARM.

Report for the Month of August, 1907.

By R. C. Baird.

The rainfall for the month (443 points) was in excess of requirements, and caused the ground to become very wet and cold. A few frosts were experienced, and their effects on the crops are noticeable. Rain fell on 17 days during the month, and retarded farm operations.

Owing to the boggy condition of the ground fallowing had to be suspended at the end of July; and since that time we have not been able to carry on this work with satisfaction. We have endeavoured to keep on ploughing on small patches that appeared likely to carry the teams, but without much success. About 15 acres have been ploughed during the month, making in all about 120 acres ploughed for fallow.

The wheat crops are looking well, and the prospects of a good yield are better than they were at this time last year.

The oat crop, although on low-lying ground, is looking well for this time of year. A few patches are showing the effects of excessive moisture and frosts. A week or two of fine weather will bring this crop on.

The barley and rye sown for silage is making excellent growth, and with favourable weather should give a good yield of fodder when cut.

The barley and rape sown in April has been carrying a large number of stock for some time, and has proved most valuable as a fodder for horses, cattle, and sheep.

Result of Grass Plots.

A number of grass plots were sown in August last year. A few notes on their appearance now, twelve months after sowing, may be of interest:—

Cocksfoot.—Germinated well; made good growth; vigorous now.
Tall Fescue.—Germination good; growth vigorous; looking well.
Hungarian Forage Grass.—Germination poor; withered up in summer.
Tall Oat Grass.—Germination good; looking well.
Sheeps Burnett.—Germination good; gave good results; looking well.
Rib Grass.—Germination good; looking well.

Chicory.—Germination good; looking well.

Wallaby Grass.—Germination poor; withered up in summer.

Perennial Rye Grass.—Germination good; grew fairly well; looking well now.

White Clover.—Germination good; grew fairly well; looking well now.

Red Clover.—Germination fair; grew fairly well; doing well now.

Scarlet Clover.—Germination very poor; died off in summer.

Paspalum Dilatatum.—Germination poor; plants doing well now.

Rhodes Grass, Roots.—Grew runners 3ft. long; doing very well.

African Wonder Grass, Roots.—Made good growth in summer.

The sheep are doing well. The lambs marked from the various flocks are as follows:—

Crossbred ewes—lambs marked, 87 per cent.

Pure Shropshire ewes—lambs marked, 120 per cent.

FRUIT FLY.

Instructions to Fruit Growers.

By T. Hooper.

Now that summer will soon be here, and with it the fruit fly, I wish to call the attention of all orchardists, also those people who happen to have one or two trees, to the following directions, which will be enforced this year for fruit fly:—

"All fallen fruit throughout the orchard must be gathered daily, and all maggoty fruit destroyed by burning or boiling.

"In addition to these precautions, throughout the summer shallow vessels partly filled twice a week with kerosene must be placed one or more in each tree in the orchard, and shall be kept in or removed to such trees as an Inspector may from time to time require.

"A substitute for kerosene may be allowed subject to an Inspector's written consent."

To get the best effects from the above it is absolutely necessary to be moving early, and steps should now be taken to collect all available tins, the shallower the better (lids of cocoa and other tins do admirably), and then early in December a piece of narrow board should be tied in the fork of the tree, and one or more tins should be placed thereon and half filled with kerosene twice a week. Every fly caught early in the summer is worth, I consider, one pound, or even more. The old system of picking and boiling all wormy fruit should still be adhered to, as it is no use breeding them in order to kill them with kerosene or other process. The two means of destruction must be worked together in order to get the full benefit of their application. Last season, as soon as the kerosene was reported as a good trap for catching the fruit flies, this Department, with the kind assistance

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of Mr. J. P. Williams, North Perth, carried out experiments with benzine, naphtha, turpentine, ammoniated tar water, methylated spirits, etc., but in no instance did any of them equal the kerosene. Experiments were also conducted with a poisonous spray, which also proved effective in killing the flies.

Last season, in one orchard, 1,268 flies were destroyed by means of kerosene in 24 hours; and in another orchard where no flies could be seen and only a few maggoty fruits had been found the kerosene caught a single pair of flies.

It will be of assistance to this Department, and thereby to all orchardists, if those people who have experienced practical results from any experiments they may have made relative to the above would kindly forward particulars of the same to this Department.

COLD STORAGE NOTES.

By A. D CAIRNS.

September being now upon us with its balmy days and dry nights, the fowlyard denizens get an extra hour's work in before breakfast, and another after tea. For solid overtime work the Western Australian hen is hard to beat this month or next; activity is the order of the day. Many an honest, self-respecting hen has earned its day's fodder before some of us have left the land of visions; and probably while we are dreaming or scheming out how to dodge some of the involving meshes of the new tariff the honest hen has paid her land tax and the 25 per cent. on cooking utensils in which her breakfast has been prepared.

Doubtless our hens (representatives of classic breed, though many times removed), while roosting on a budding fig-tree whose branches are showing the vigorous spurs of spring, dilate on the iniquitous rise on roofing tiles—30 per cent. *ad val.* The Leghorn prince, discussing this point some nights ago with a lady of his coterie from Minorca, mentioned that these starlit skies were somewhat more conducive to arduous laying than being housed under Marseilles tiles or galvanised iron, "25 per cent., n.e.i." So far as things have gone, our experience has been the common one, and that is, that eggs are plentiful, notwithstanding the tariff or the latest weighty decision of the Arbitration Court on a fair day's wage for the arduous and dangerous trade of making hen-coops.

"Egg contents, dry, per lb., 1s. 4d.

"Egg yolk, dry, per lb., 1s. 8d.

"Egg albumen, dry, per lb., 2s. 6d.; or egg (not in shell) in liquid form, when used in the industries other than those for the preparation of articles of food, and denatured, may, as prescribed by departmental by-laws, be delivered free."

The crossbred, comeback Plymouth Rock, on reading this preferential paragraph, nudged her neighbour, remarking, "This is a White Leghorn for a White Australia; nothing but Golden Wyandottes can hold out now; we, the hen workers of Australia must unite; nothing but *entente cordiale* with Spain will prevent us being as closely sat upon as the Brahma sticks to that 'partly wool or silk made up nest, 40 per cent. *ad val.*' "

Whether the limitations of the reasoning powers of the domestic hen will ever be properly gauged is not so certain or as important at present as what is the best thing to do with a surplus of eggs.

Eggs now in the market often sell under tenpence per dozen, while Adelaide eggs are practically lining and ceiling the grocers' stores after being landed at Fremantle under eightpence (8d.). It is time the local egg-grower called in the cold storage man to tide him over his difficulty. It is a long wait till next May for a substantial rise in the market. It may be that, like the present year, the usual high price may not eventuate, owing to mildness of the weather or early moulting. Disappointment met some who were impatient for a turnover; but all without exception wished they had stored heavier last October.

Some good men in the egg business in Perth believe that a surplus of green feed tends to make the eggs thinner and less likely to keep well. Others believe that the reddening of the yolk after eight months' storage causes the straw taste of the long-stored egg. Be that as it may, we have eggs here in the same room since October, 1905, and it is hard to distinguish them from four-week's-old eggs. If you have a surplus, fill a box with paper fillers or wire fillers. We will keep it for 1s. per calendar month and hand out a few dozen every Saturday if you leave your basket. A kerosene case clean and free from smell, and clean *infertile* eggs as they come from the bird is all you require. A case is known as 25 dozen.

A suburban lady last year stored a few cases at the time she could not get one shilling per doz. She sold them for 1s. 5d. average in May on a glutted market. Figure this out. This is not the best that has been done, or the worst either. The intelligent, better informed suburban housewife with her few dozen fowls should avail herself of the cold store. We are right on the premises here to do her work cleanly by pure cold air. No chemicals or other smellful nostrums that spoil the hands or endanger the eyes used. Send along your clean cases full of your surplus. Sands & McDougall will supply you with enough pasteboard fillers to fill a case for a shilling.

While the egg remains the work of a secret process of nature, and as long as such a delicacy contains sulphur, it is hardly within the bounds of science to entirely prevent decay indefinitely. The slight straw taste that is sometimes inexplainable will never abolish the storing of surplus by the thrifty. The egg business combined with poultry is worth more millions sterling to the United States than the much lauded steel industry. There is no reason why our poultry harvest should not ultmately rival the wealth of the Eastern Goldfields.

The National Poultry Conference held at Reading in July last dealt with a great many matters of cold storage interesting to the poultry man. Mr. H. C. Cameron, Produce Commissioner of New Zealand, described the progress, development, and methods of Government assistance to poultry farmers. Instructors are provided to assist and advise small farmers, as we do here, and the Government has provided grading depots at four different ports where fat poultry is received, dressed, cased, and frozen methodically. Fowls cost 4d. each; turkeys, 8d. White fleshed, well breasted, and breeds having white legs being preferred. Birds are sent alive to the depot under the control of the Department of Agriculture, who take full charge of selection or rejection of all birds.

Major Norton, of South Australia, recounted his experience with the cold storage of eggs. He said: "The stores have often been blamed, while in reality it was the producer himself that was at fault. If success was to be obtained, absolutely fresh infertile eggs must be obtained and kept at a steady temperature of 33-35 deg. F. in an odourless chamber; and notwithstanding trade prejudices, they were fit for boiling, frying, or poaching at the end of four months."

If this is a sample of good work in South Australia, egg-growers should consider the harder conditions here, where eggs are mostly kept in cold storage for *eight* or *nine* months before the good rise of the market takes place.

This is the result of the South Australian surplus keeping our market low most of the year. However, they are good eggs they send us, and well worth the money; and egg handlers here should now soon be able to have sufficient local supply to keep the price of any imported eggs steady and reasonable.

THE FERTILISERS ACT.

The Inspector of Fertilisers, Mr. P. Wicken, reports having received from the Government Analyst a further list of analyses of fertilisers taken in connection with the Fertilisers and Feeding Stuffs Act. This list completes all the samples taken up to the present time.

For the benefit of those who wish to compare the value of these fertilisers, the cash value on a unit basis is given for the registered samples and results as found by the Government Analyst.

The unit values are as follow:—

Ingredient.	Form.	Value per unit. s. d.
Nitrogen	In form of nitrates (nitrate of soda)	17 9
Do	do sulphate (sulphate of ammonia)	17 6
Do	Inorganic matter (blood and bone manures)	15 3
Potash	As sulphate	5 10
Do	As muriate	4 6
Phosphoric Acid	Water soluble	5 2
Do	Citrate soluble	3 6
Do	Acid soluble	3 3
Do	In Thomas' Phosphate without regard to solubility	3 5

The value of the fertiliser is obtained by multiplying the percentage of each ingredient contained by the unit value of that ingredient.

THE ANALYSIS OF FERTILISERS.

	Number of Sample.	Name of Fertiliser.	Where obtained.	Nitrogen.	Water Soluble Phosphoric Acid.	Citrate Soluble Phosphoric Acid.	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.	Value on Unit Basis. £ s. d.
Guaranteed analysis	147	Nitro bone manure (Binney & Son)	Binney & Son, Weshpool	4·00	...	...	14·00	14·00	1·50	5 15 0
Found by Government Analyst	147	Do.	do. do.	4·78	...	...	10·9	10·9	1·35	5 16 1
Guaranteed analysis	148	Special orchard manure	Couche, Calder, & Co., Welshpool	1·50	8	3	6	17·00	3·50	5 14 8
Found by Government Analyst	148	Do.	do. do.	·9	5·51	1·74	12·10	19·35	3·70	5 9 2
Guaranteed analysis	131	B.B.P., Crown	do. do.	·30	6	2·25	7·50	15·75	3	4 5 4
Found by Government Analyst	131	Do.	do. do.	1·03	3·81	5·30	8·67	17·78	2·64	4 17 6
Guaranteed analysis	130	Potato manure, Crown	do. do.	2	11	2	...	13·00	3·50	5 14 9
Found by Government Analyst	130	Do.	do. do.	1·68	11·14	2·33	3·98	17·45	3·82	6 6 8
Guaranteed analysis	146	Bonedust, Swan	J. M. Drummond, Perth	2·75	...	...	18·30	18·30	..	5 1 0
Found by Government Analyst	146	Do.	do. do.	2·94	...	...	18·81	18·81	.	5 6 0
Guaranteed analysis	142	Grass manure	Gardner Bros., Perth	..	7·00	11·00	1·00	19·00	·60	4 1 5
Found by Government Analyst	142	Do.	do. do.	...	4·92	13·29	1·71	19·92	·50	4 2 0
Guaranteed analysis	141	Superbonedust, Peerless	W. Padbury, Guildford	3·50	...	...	41·00	41·00	.	9 6 7
Found by Government Analyst	141	Do. do. do.	do. do.	1·61	...	.	16·95	16·95	...	3 19 7
Guaranteed analysis	144	Muriate of potash	Guthrie & Co., Fremantle	..	..	.	...	...	50·00	11 5 0
Found by Government Analyst	144	Do.	do. do.	...	..	..	...	...	60·47	13 12 1
Guaranteed analysis	143	Sulphate	do. do.	..	..	...	...	...	44·50	12 19 7
Found by Government Analyst	143	Do.	do. do.	...	...	..	...	...	45·37	13 4 7
Guaranteed analysis	145	Kainit	do. do.	...	.	...	...	...	12 1	3 10 7
Found by Government Analyst	145	Do.	do. do.	...	..	...	...	...	11·97	3 9 9
Guaranteed analysis	149	Orchard manure	Gardner Bros., Perth	1·20	14·00	1·00	1·00	16·00	2·7	5 15 10
Found by Government Analyst	149	Do.	do. do.	2·02	15·23	1·61	·14	16·98	4·42	7 1 0
Guaranteed analysis	151	Sulphate of Ammonia	W. R. Haynes & Co., Perth	20·00	...	...	...	...	.	17 10 0
Found by Government Analyst	151	Do.	do. do.	20·33	.	...		..	.	17 15 9
Guaranteed analysis	150	B.B. manure	Gardner Bros., Perth	6·00	..	...	12·00	12·00	..	6 10 6
Found by Government Analyst	150	Do.	do. do.	6·50	...	...	13·77	13·77	...	7 3 10

Guaranteed analysis	152	Bonedust, Elephant No. 1 ...	Guthrie & Co., Fremantle	3·50	.		18·30	18·30	...	5	12	9
Found by Government Analyst ..	152	Do. do. .	do. do.	3·08	...		14·61	14·61	...	4	14	4
Guaranteed analysis	166	Bonedust, Champion ...	C. Neumann, Albany	3·50	...	3·00	16·00	19·00	..	5	15	10
Found by Government Analyst .	166	Do. . .	do. do. .. .	4·00	...	6·77	12·29	19·06	...	6	4	7
Guaranteed analysis . .	153	IXL Fertiliser No. 7 ...	Barnett & Co., Albany	·63	9·01	3·49	4·93	17·43	. .	4	4	3
Found by Government Analyst ...	153	Do.	do. do.	·21	9·06	2·68	8·86	20·60	...	4	8	6
Guaranteed analysis	155	IXL Fertiliser No. 4	do. do. ...	..	18·00	1·50	1·50	21·00	..	5	3	1
Found by Government Analyst ...	155	Do. do.	do. do.	...	16·30	0·18	3·08	19·56		4	14	9
Guaranteed analysis ...	156	Do. No. 9 ...	do do.	. .	17·00	1·00	2·00	20·00	..	4	17	10
Found by Government Analyst	156	Do. do. ...	do. do.	...	14·39	3·17	2·29	19·85		4	12	10
Guaranteed analysis	157	Bone Super. St. George .	Drew, Robinson & Co., Albany ...	1·60	7·00	7·00	3·00	1·700	...	4	14	9
Found by Government Analyst ...	157	Do. do.	do. do. ...	2·03	7·74	4·54	9·25	21·53	...	5	16	8
Guaranteed analysis	158	Bonedust do.	do. do. ...	3·50	.	.	18·3	18·3	...	5	12	9
Found by Government Analyst ...	158	Do. do.	do. do. .	3·99	..		19·31	19·31	. .	6	3	8
Guaranteed analysis	161	Potato Manure, St. George	do. do. .	1·50	9·16	4·58	2·29	16·03	4·50	6	3	2
Found by Government Analyst .	161	Do. do.	do. do.	2·24	9·42	3·69	6·15	19·26	2·50	6	15	2
Guaranteed analysis ...	167	Do. Champion ...	C. Neumann Albany	1·50	9·16	4·58	2·29	16·03	4·50	6	3	2
Found by Government Analyst	167	Do. do. ...	do. do.	2·24	9·69	3·07	4·90	17·66	5·57	7	3	5
Guaranteed analysis	172	Super. Bonedust (Binney & Son)	J. M. Drummond & Co., Fremantle ...	·75	...	...	17·00	17·00	1·15	3	13	4
Found by Government Analyst ..	172	Do. do.	do. do.	1·65	...		12·30	12·30	2·09	3	17	2
Guaranteed analysis . ..	171	Kainit	do. do.	..	.	..	...	. .	12·00	3	10	0
Found by Government Analyst ...	171	Do.	do. do.	.	...	..	...	...	11·67	3	8	0
Guaranteed analysis ..	175	Do. ..	Couche, Calder, & Co., Welshpool ...	...	...	...	...	...	13·00	3	10	0
Found by Government Analyst ...	175	Do.	do. do. ...	..	..	. .	...	...	12·25	3	11	5
Guaranteed analysis	174	Potash superbone manure .	do. do. ...	1·25	4·00	5·00	6·00	15·00	3·00	4	14	2
Found by Government Analyst .	174	Do. do. do.	do. do. ...	2·4	2·78	5·15	9·50	17·43	2·87	5	16	6
Guaranteed analysis . . .	177	C.W.P. (Haynes & Co.)	W. R. Haynes & Co., Perth	5·36	...	..	17·40	17·40	...	6	18	1
Found by Government Analyst ...	177	Do.	do. do.	4·93	...	...	18·69	18·69	...	6	15	10
Guaranteed analysis ..	176	Haynes, B.B. . ..	... .	4·50	..	12·00	...	12·00	...	5	10	7
Found by Government Analyst ...	176	Do.	.. . .	4·31	...	4·07	9·32	13·39	...	5	10	1
Guaranteed analysis	173	Sulphate of potash	Guthrie & Co., Fremantle	...	...	...	...	...	44·5	12	19	7
Found by Government Analyst ..	173	Do.	do. do.	...	...	...	..	...	46·90	13	3	7
Guaranteed analysis	163	Sulphate of potash . ..	Drew, Robinson, & Co., Albany ...	...	.	.	...	...	51·00	14	17	6
Found by Government Analyst ...	163	Do.	do. do. ...	...		...	...	. .	48·15	14	0	10
Guaranteed analysis	178	Sulphate of ammonia	Guthrie & Co., Fremantle . .	20·00	..	..	...	...	...	17	10	0
Found by Government Analyst ...	178	Do.	do. do.	20·44	...	...	...	...	...	17	17	7

PRESERVATION OF BAGS FOR STORING SUPERPHOSPHATES AND SULPHUR.

At the suggestion of Mr. Charles Harper, of Guildford, experiments have been undertaken for the purpose of devising some method of minimising the destruction of bags used for the storage of superphosphates. The matter was placed in the hands of Mr. E. A. Mann, Government Analyst, who reports:—

"That bags treated by three methods were sent to Mr. Binney at Welshpool, who kindly undertook to test them.

"They were filled with German superphosphate of a very acid character on 11th February last, and stacked amongst other bags in a store. Mr. Binney considers the test as severe as could be applied.

" On the 28th August last I visited the works and examined the bags Two of them had rotted, though not so badly as untreated bags, but the third one was remarkably sound.

" I submit for comparison this bag and the ordinary double bags in which this superphosphate was imported and which speak for themselves.

" The bag was treated by being tanned merely by soaking in a solution from ordinary red gum kino.

"As the bag has withstood over six months' storage, I think the experiment may be considered highly successful and recommend its publication.

" My thanks are specially due to Mr. Binney for his valuable assistance."

The Hon. the Minister for Agriculture, Mr. James Mitchell, in referring to the report, said:—"I am much obliged for this report of a most valuable discovery, and I hope you will put several bags similarly treated into use without delay. Bags so treated might come into general use and should save an immense amount of money for shippers and others who have to hold superphosphates in bags on their premises."

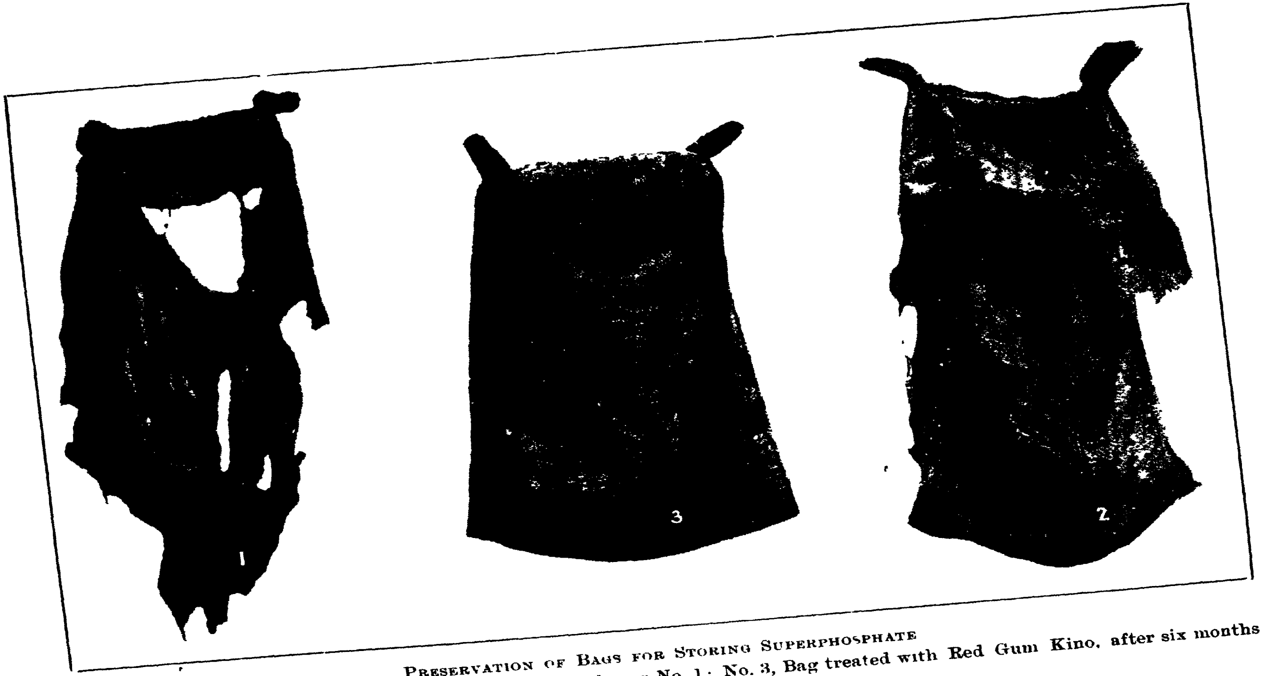
Since reporting on the above matter, Mr. Mann has received the following letter from Messrs. Guthrie & Co., of Fremantle:—

"A few days ago one of our clients who deals largely in sulphur, wrote complaining of the condition of the bags, and asked if we could in any way prepare these bags to make them carry better, and stand the action of the sulphur, as it apparently rots them through the course of the voyage and after being stocked, in a comparatively short time.

" We noticed in this morning's paper that you have been successful in experimenting for treating bags for superphosphates; would you be good enough to let us know if the same preparation would stand the action of sulphur? We could then advise our Sicily friends and possibly do business in the preparation of the bags for the export of this article throughout the world."

In reply to this, Mr. Mann wrote as follows:—

"With reference to your letter of 30th inst., inquiring as to the destruction of bags containing sulphur, I beg to inform you that I have not specially studied the effect of sulphur on bags, but as the impurity which probably causes the trouble is sulphuric or sulphurous acid and, as it is the sulphuric



Preservation of Bags for Storing Superphosphate

No. 1, Original bag eaten away, No. 2, Covering bag used over No. 1: No. 3, Bag treated with Red Gum Kino, after six months test. (*See* letterpress.)

acid which causes the damage in the case of superphosphates, it is very probable that the same treatment would prove effective in this case also. It is at least worth a trial."

The ilustrations show the difference between bags treated and untreated. As will be seen, the untreated bags have suffered severely, being practically rotten, and would require rebagging before sending out, while the bag treated by Mr. Mann would remain sound for a still longer period.

MORTALITY AMONG CATTLE IN THE SUSSEX DISTRICT.

By J. L. Burns, V.S., Acting Chief Inspector of Stock.

I visited this district early in the present month to inquire into the reported mortality among the cattle in that part of the State.

Unfortunately, for the purpose of investigation, no animal could be found affected with the complaint at the particular time of my visit and I was, therefore, unable on this account to make a post mortem myself, which no doubt would have been more satisfactory than obtaining evidence from others. But apart from this and from all the information I was able to gather from the most reliable and oldest settlers in the locality, I do not think there can be the least doubt about the cause of the mortality.

One gentleman at Yallingup, Mr. N. Abbey, who had been nearly 40 years in the district, told me he had lost many cattle in the past. In every instance where he had made an examination after death he had found the stomach (known anatomically as the Omasum or third stomach, and commonly as the Bible) full of a hard, dry impacted mass of scrub and other indigestible stuff, that the cattle had been trying to exist upon in the bush. He assured me the contents of the stomach was so hard in some cases that he had seen that a knife could scarcely be pushed into it, and so dry, that when broken up it filled the atmosphere with a fine dust. There is no doubt whatever but that this state of the digestive organs was sufficient to account for the mortality.

I have, however, made arrangements that whenever another animal should die of the same trouble to have the stomach and any other suspected organs forwarded immediately to Perth, so that the matter may be gone further into if necessary.

Mr. Gale, a very old settler in the Busselton district, said the cause of the mortality was nothing new to him, as he was satisfied, in his own mind, that it was entirely due to the non-succulent and indigestible nature of the natural herbage. After I had been over some of the country and seen for myself the state of affairs and of the condition of the cattle living on it, I could not do otherwise than agree with Mr. Gale.

Other old settlers told the same story, although some persons whom I spoke to on the subject would persist in saying that the cattle had been dying of some mysterious disease imported, so they said, from the Eastern States. This I am quite certain is not a fact, and is merely fancy on their part. I am also just as certain, in my own mind, that when the land is cleared and properly manured, and the growing of suitable grasses for stock is an accomplished fact, there will be no further mortality from the cause referred to. When the settlers become versed in the application of fertilisers in the soil, many and wonderful results may be expected from their application to the land in the Busselton district. With regard to the mortality among the stock, I am forced to come to the following conclusions from the available information on the matter in my possession:—

1st. That the cattle in the Sussex District are not affected with any infectious or contagious disease.

2nd. That the cause of the mortality has been a digestive trouble, viz., impaction of the third stomach for the reasons stated, and animals have been lost off and on ever since this part of the country was first stocked from the same cause. It is no new thing.

3rd. That the remedy lies with the settlers themselves in making no effort to reclaim the land and grow suitable fodder grasses for the stock.

Meanwhile, if I might suggest anything in the way of treatment for the existing state of affairs, which at the best is unsatisfactory, as it consists in the administration of medicine which does not attack the source of the trouble, but the effects of it, I would advise in cases where an animal is found affected and before it becomes too weak, that something in the nature of a laxative or purgative should be given to endeavour to get the digestive organs cleared before they have time to get completely blocked up and their functions entirely suspended from partaking of the non-succulent and indigestible food:—

Raw linseed oil, 1 pint along with 15 drops of croton oil, would no doubt have the desired effect in the earlier stages.

Magnesium Sulphate (Epsom Salts) in half pound doses in about a quart of water may be given if preferred, but in all cases care must be exercised that this line of treatment is not over done, otherwise the cure will be as bad as the disease.

A SILO.

The Agricultural Department have notified the Northam Agricultural Society that it is their intention to erect a silo on the show grounds during the National Show. This will enable farmers who are not conversant with this means of preserving fodder during the summer months an opportunity to see this up-to-date method.

The Agricultural Department are sparing no pains to educate the farmer, and this, their latest effort, is indeed worthy of consideration.

NATIONAL SHOW.

Appointment of Judges and Stewards.

The following is a list of the judges and stewards appointed for the National Show to be held this year at Northam.:—

Judges.

Horses: Thoroughbreds and ponies—Mr. W. B. Mitchell; draughts—Mr. J. McBurney.

Cattle: Shorthorns—Mr. A. Watson; dairy breeds—Mr. Kinsella; fat cattle—Mr. C. H. Stubbs.

Sheep: Merino— ; Shropshire and Lincoln—Mr. J. P. O. Wellard; fat sheep—Mr. C. H. Stubbs.

Wool: Same judges as for sheep.

Pigs: Mr. C. H. Stubbs.

Poultry: Wyandottes, Indian Games, Orpingtons, Langshan, and British Game—Mr. T. G. Halbert; all other breeds—Mr. Vaughan.

Dairy Produce: Mr. Macfarlane.

Gardens: Messrs. G. L. Throssell and H. P. Colebatch.

Farm and Garden Produce: Mr. C. R. Knight.

Grain: Mr. W. Bowden.

Wines: Mr. A. Despeissis.

Fruits: Mr. A. Despeissis.

Flowers: Mesdames F. Smith, G. Hodges, and H. P. Colebatch.

Miscellaneous: Mesdames G. L. Throssell and J. Mitchell.

Bread: Mr. H. Thielemann.

Industrial: Messrs. J. Byfield and J. Sermon.

Implements and Machinery: Mr. G. H. Smith (York).

Pasture Plots: Mr. J. Martin, jun.

Official Measurers: Messrs. A. Brenner and V. H. Spencer.

Stewards.

Horses: Thoroughbreds, roadsters, and horses in action—Messrs. McKinnell, A. G. Loton, and R. Woolfe; Clerk of ring events—Mr. C. Gillespie; draughts—Messrs. W. H. Lawrence, H. W. Hancock, and K. Stewart.

Cattle: Messrs. A. Martin, J. M. Carroll, and F. B. Timperley.

Sheep: Messrs. F. R. Walsh and R. Ackland; Shropshires, Lincolns, and fats—Messrs. J. Martin and C. Martin.

Pigs: Mr. A. A. Smith.

Poultry: Messrs. G. T. Wilkerson, H. Slater, and E. Sibbald.

Pavilion: Messrs. I. Solomon, E. W. Carter, C. A. H. Mills, and W. J. Stewart.

Implements, Etc.: Mr. J. McManus.

Entertainment Committee: The President (Mr. T. H. Wilding), and Messrs. J. Mitchell, G. L. Throssell, S. Solomon, C. R. Knight, H. W. Lunn, and F. Rewell.

Any committeeman or steward who may be unable to act is requested to notify the secretary at once, so that his place may be filled.

DISEASES OF ANIMALS.

LECTURE by J. L. BURNS, V.S., Acting Chief Inspector of Stock, delivered at the City Council Chambers, Perth, September 6th, 1907.

The most prevalent disease of a serious nature is that known as Tuberculosis, which is common to most of the domestic animals as well as man. Fowls are also frequently found affected. As the name implies, the disease is one in which the formation of nodules or "tubercles" of morbid tissue in the internal organs is a characteristic feature.

It is scarcely necessary to say now-a-days that the sole cause of the trouble is due to the presence of a living organism, the tubercle bacilli. These minute micro-organisms are in shape like rods. Experiments have proved that they are found to retain their virulence even in the presence of putrefaction for a considerable time. No antiseptic yet known can destroy the bacilli of tuberculosis within the body without at the same time killing the animal also.

Their growth is slow at 86 deg., flourishes at 98 deg., diminishes at 100 deg., and arrested at 104 deg. Fahr.

It would thus appear these organisms are in more hospitable quarters in human beings with a temperature of 98 deg. than in cattle with that of 101 deg. The disease might exist in man and animals for a considerable period without showing marked development, and a mere cough was not in itself a certain symptom of its existence. From the experience of the principal cities of the world where public abattoirs were in existence it is found that from 50 to 60 per cent. of cattle suffering from this disease were affected in the lungs or pleura.

The milk taken from cows with tubercular deposits in the udder is now recognised by the best authorities as being in the utmost degree dangerous, and therefore, in order to take every precaution, milk used as an article of diet should always be boiled. Meat should also be thoroughly boiled or roasted before being eaten, in order to ensure the destruction of any bacilli which may possibly be present in it. It is well to remember that when meat is cooked in the ordinary way the central portions are not heated as much as the outer portions are.

Fresh air and plenty of sunlight seem at present the best and most natural cures for patients suffering from tuberculosis, especially in the earlier stages; while medicine, which I have small faith in at any time, cannot be relied upon as a positive remedy.

The "tuberculine test," now well known, is no doubt a very valuable diagnostic agent when properly used. It is simple, and no wonderful degree of skill is necessary when once it is explained. All that is needed is a civilised man with common sense. Cleanliness is the key-note of success.

The instruments used must be thoroughly disinfected by means of a solution of mercury chloride 1 in 2000, and then washed out with absolute alcohol. The proper quantity of tuberculin having been placed in the syringe the injection is made beneath the skin of the back just close to the scapula or shoulder blade. This spot is chosen because here the skin is loose and the effects cause least inconvenience. The animal suspected should be tested when at absolute rest, when the temperature is normal, and the best time for operating would be at 7 in the evening, thus allowing 12 hours to elapse before observations were made at a convenient hour next morning.

The normal temperature of cattle is 101 deg. F., and if found 10 or 14 hours after the injection of the tuberculin that the animal's temperature has risen to say, 103 or 104 and after that gradually falls until normal again 24 hours after, it is strongly suspicious of the presence of tuberculosis, and the animal showing such "reaction" should either be destroyed, or isolated and fattened for the butcher.

The question of how far tuberculosis renders cattle unfit for human consumption has been considerably discussed. Some authorities maintain that where an animal is found affected in the slightest degree the whole carcase should be condemned, but this, when one thinks over matters, seems to be going to extremes. Where certain organs only were affected and the disease was localised in the lymphatic glands it is the usual custom to destroy those parts only, but where the disease has extended to the blood stream and become general throughout the system, then the whole carcase should be destroyed. The contagious form of Pleuro-Pneumonia is a very serious disease affecting cattle only, for which there is no cure, and the beast should be destroyed and the carcase burnt.

This disease has cost Great Britain over a million of money during the past 25 years, and it is not easy to estimate how great the loss must have been from the same cause throughout Australia within the same period. No doubt a small part of the money value would be sufficient to square our deficit in Western Australia at the present time.

The period of incubation is about 42 days or 6 weeks, and therefore it is on this account possible for animals to be imported here from the Eastern States (where I may mention we got it from originally) suffering from this complaint without it being apparent or developed until some time afterwards.

Strict quarantine on arrival would no doubt be the only certain safeguard against this, extending over the incubative period, but there are many difficulties in the way of its adoption, not the least being the serious interference with trade, and the loss in condition of animals, especially dairy cows, when kept confined in this way.

However, it is a matter for congratulation that at present, in spite of all risks run, this State is free from the disease, I believe, at all events the southern parts of it outside the quarantine area of East Kimberley.

The post mortem examination in cases of contagious pleuro-pneumonia show the lungs in a solidified condition and of a characteristic marbled appearance, with fluid exudation into the thoracic cavity.

The common method of prevention by inoculating is simple enough, and may be done by any person when once they are shown how to operate—

the introduction of a little of the virus on a thread of wool passed beneath the skin of the tail near the end is all that is necessary, but care should be exercised (and this point is very important) to make sure that the animal from which the virus is taken is not affected with tuberculosis, otherwise that disease may possibly be introduced which, as will be seen, would be most undesirable.

If the tail gets very sore and swells much the simple remedy, often resorted to, is to chop a portion of it off to prevent the inflammation from proceeding further into the body of the animal.

Actinomycocis, known also as Lumpy Jaw in cattle, is rather prevalent in Australia. It is due to a fungus called the "Ray fungus." It cannot be properly considered as a contagious disease, and there is not much danger of its being transmitted to persons who use the flesh of animals so affected for food except in cases, which are rare, where it is disseminated throughout the body.

Swine Fever is supposed to have been first heard of from America about 60 years ago. Since then it has certainly been the cause of very great mortality among the pigs.

It is caused by the introduction into the system of a living organism which is very minute, and may only be seen under a microscope of high power. The period of incubation is about 14 days, but variations occur, no doubt due to climatic conditions.

Ever since swine fever was recognised as a specific disease it has been regarded as an affection of the intestines, principally on account of the characteristic ulcerated state of these organs.

In England the average annual loss of pigs from swine fever during the past 14 year has been something like 45,000, and has gone up on occasions as high as 80,000.

In some of the United States of America, Nebraska for instance, in 1884-5 nearly half a million pigs died each year, being about one-fourth of the pigs in the whole State. In Western Australia, owing to the precautions taken, the mortality has been small, hardly 1 per cent., so that compared with other countries, such as France and Germany, who have each lost a quarter of a million of money in a few years from the ravages of swine fever, we have, I think, good reason to congratulate ourselves.

The disease is not communicable to human beings.

JOTTINGS ON THE SOUTH-WEST.

By J. S. Jefferson.

The rainy season, late in coming, has lately been doing its best to make up for lost time, and during the past five weeks the South-West district of the State has abounded with storm and rain. Heavy North-West storms prevailed along the coast, but in the Blackwood hills the heaviest blows of the winter came from an Easterly direction. As yet feed is backward, and not until the weather becomes settled can the farmer hope for any more rapid growth. The ground at present is too wet. The season, so far, has been characterised by almost an entire absence of frost, even in the Blackwood district. Growing crops, though making very little advance, are yet of healthy colour, and only await the advent of settled weather in order to make rapid progress. Sheep, especially early lambing ewes, suffered in many cases during the early part of the winter from shortage of feed. This was caused in most cases by the fact that no early winter rains fell to start the feed. The planting of rape, barley, and oats for winter feed, and of peas for summer feed for sheep, cattle, and horses is rapidly coming into favour. The barley and rape make better growth than oats during the cold, wet weather, and stand feeding down more often. Quite a number of small dairy herds are being established this winter. The assistance afforded the settlers in this direction by the Agricultural Department is commendable. But even when the cattle have been obtained a serious want still faces the intending dairyman, namely, the procuring of summer feed at a payable cost. The native grasses are totally useless for this purpose, or, indeed, for most other purposes after January. Already the peach and almond are bursting into bud and blossom, and pruning is well under way in most orchards. A vast improvement is noticeable in the methods of pruning, cultivation, and cleanliness in most orchards now as compared with those of five or six years ago.

On the drier soils in the vicinity of Busselton, I have to-day seen the most forward grain crop, quite 12 inches high. In the vicinity of Pinjarrah the crops are also forward. Throughout the district generally, crops on heavier lands are backward. Fruit tree planting is being rapidly pushed forward, but scarcely so extensively as last year. In the Harvey district, a large drain is now being constructed along the Udoc Road in a westerly direction for about three miles, thence turning north for two miles and discharging into the Harvey River. This work, which is being constructed by the Public Works Department, should form a great benefit to the settlement. Unfortunately, owing to the recent bad weather, the contractors for the drain are obliged to delay operations for the next two months, and this delay will preclude the settlers from securing any appreciable benefit from the drain this season.

The Harvey Citrus Show taking place on the 28th instant should prove a success and of interest to those who wish a pleasant outing, or are interested in citrus growing. The orange crop here looks clean and abundant. When at Hamel recently, the settlers informed me that the widening of the drain carrying the waters away from Sampson's Brook has greatly improved matters, and as a result the settlement has been almost free from floods during the winter. However, much remains to be done, both here and at Harvey, in the way of constructing subsidiary drains, as much of the ground is waterlogged during winter and early spring.

THE FRANCO-BRITISH EXHIBITION.

The Secretary to the Franco-British Exhibition Board (Mr. P. Wicken) has supplied us with the following information:—

The Franco-British Exhibition, which is to be held in London in May next, will surpass in importance and grandeur any exhibition previously held in the United Kingdom. By way of comparison the Great Exhibition of '51 comprised 21 acres, with 16 acres of buildings. The '62 Exhibition contained 23½ acres, with 16¾ acres of buildings, while the Franco-British undertaking will contain 140 acres, with 30 acres of buildings, which 30 acres does not include the edifices which will be erected by the French and British Colonial Governments, concessionaires, attractions, etc., etc.,

The space allotted up to the present time is over 800,000 feet, and various British dependencies have still to have their requirements satisfied. There is, therefore, no doubt that from these figures alone the Exhibition will be one of the largest known, and as exhibits are limited to French and British the Courts will show a remarkable versatility so far as these countries and their dominions are concerned.

The display will be made at Shepherd's Bush, which is the western terminus of the well-known "Twopenny tube" electric railway, and in addition to other attractions the Olympic Games, which were originally celebrated in ancient Greece 1,500 years back, and which were revived in 1896, will be held in 1908 in the Exhibition grounds. With this object in view the promoters have commenced the erection of a Stadium which is to cost £50,000, in order that the visitors to the Exhibition may satisfactorily view the resuscitated Athenian pastimes.

Twenty-two countries will be represented at the games, and as Olympic Committees have been formed in many parts of the globe a full field of champions in every class can be depended on to appear at Shepherd's Bush.

The catering will be on a very comprehensive scale, and the committees both in Britain and in France appear to be very actively engaged in attending to those essential details which go to make up a successful display.

EXPORT OF APPLES TO ENGLAND.

The following report of the recent shipment of Apples from this State to London has been received from Messrs. Keeling and Hunt :—

"We have the pleasure of reporting our opinion upon the following parcels of fruits inspected at your offices 7th inst., viz.:—

On shipment 11 *cases Apples from T. Price, Esq., Illawarra Orchard, Canning River, comprising Dunn's Seedling, Yates, Rokewoods.*

" The fruit in these cases arrived in good condition and would, in our opinion, meet with a good reception from March to August inclusive, especially, the Dunn's Seedling, as this fruit would be chief favourite.

" We suggest the fruit be shipped in cases containing 40 lbs. of fruit, great care being taken the cases are fully packed, to avoid shaking, each fruit to'be wrapped in white tissue paper, sample of which we enclose and advise a distinct mark being printed on the paper, so as to present a better attraction to buyers at the opening.

" The fruit to be well graded, under these classifications, and marked on the outside head of the case, No. 1, No. 2, No. 3, thus representing—

No. 1 to be large size fruit.
No. 2 to be medium size fruit.
No. 3 to be small size fruit.

Shipment of 3 *cases of Mandarins, carefully packed in trays, described as "Emperor," "Beauty of Glen Retreat," and "Thornless," forwarded by J. Dace, Esq.*

" These fruits, at inspection, had a stale and shrivelled appearance, but if this fruit could be placed at this market in a clean and sound condition during the months of Jūne and September inclusive, we think they would do well, although they should travel well in trays " as /r Cases inspected," we think the case package would be the most suitable with buyers, and, therefore, suggest the fruit to be wrapped in white tissue paper, " sample herewith," and packed in a package of two compartments, each compartment to contain three layers of 25 fruits each, making a total of 150 in each box, the number 150 to be marked on the outside head of the package. We suggest this number, as this fruit being tender cannot stand much weight.

" Each descriptive named fruit would be suitable, but should one more than another have a higher scented flavour, that one would be the most preferred."

Shipment of 2 *cases of Oranges, Navel and Valencia, consigned by R. Cowan Esq., Mundijong.*

" These arrived in unsound condition, but the samples taken showed the fruit to have been excellent, especially the " Navel Orange," and this fruit would do well here during the months of July to September inclusive.

"The fruit should be wrapped in white tissue paper, 'sample quality enclosed,' and packed tightly in cases of two compartments containing, say, of—

Large fruit, 50 Oranges in each compartment.
Medium size, 75 Oranges in each compartment

the numbers being respectively marked on the head of the case.

"The Valcencia Oranges we suggest should be of good medium size fruit, and shipped in cases of two compartments of 75 Oranges each, 150 Oranges in all, wrapped in paper as described above.

"The sample case of Lisbon Lemons arrived very unsound, but shipment of this article we cannot recommend for we fear loss must accrue, our market at all seasons of the year being well supplied from the ports of Naples, Palermo, and Messina.

"Trusting these remarks may be of service and placing our service at any time at your command."

Commenting on this report, Mr. P. W. Wickin, Field Officer of the Department, says:—

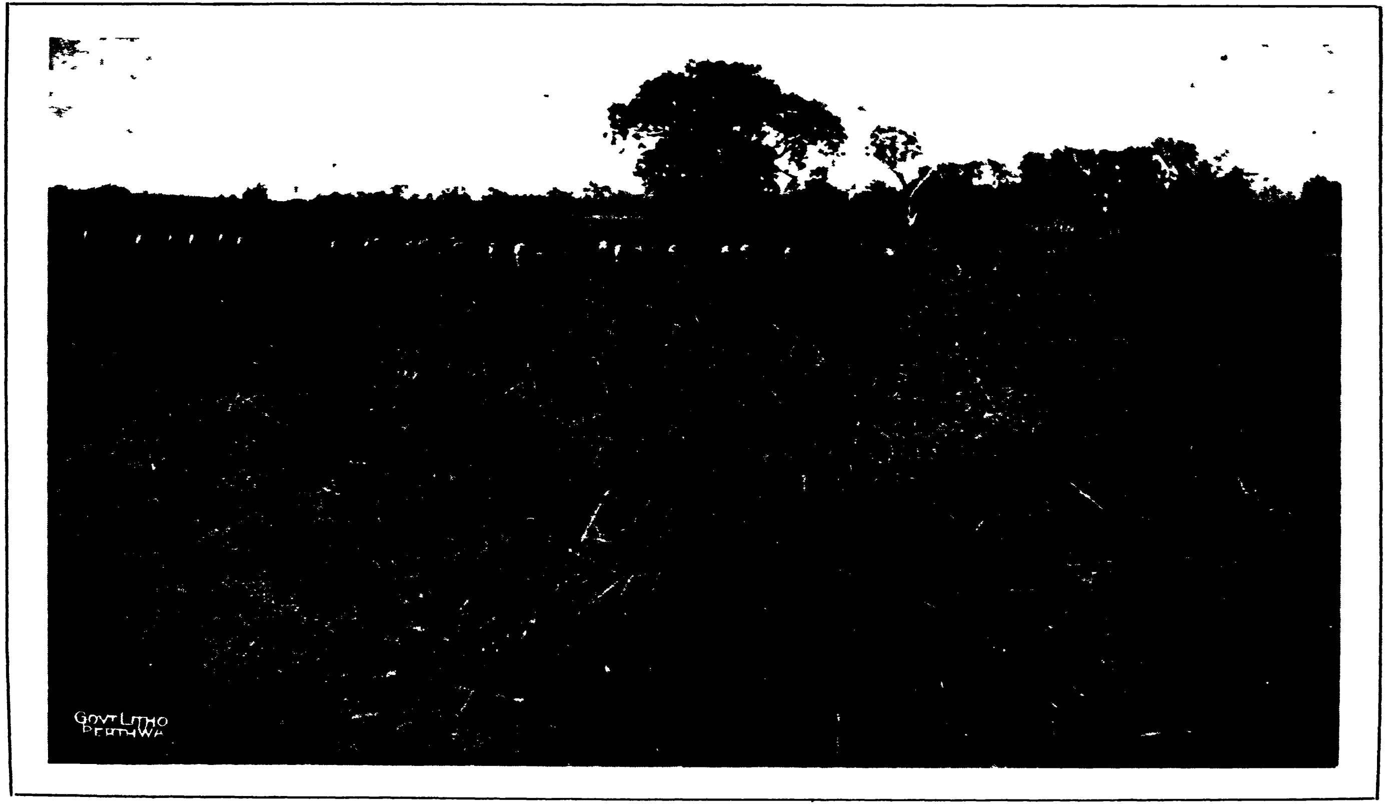
"With regard to the notice appearing in the *West Australian* Newspaper of Friday, September 13th, *re* shipment of fruit for London per R.M.S. "Orient" on June 24th. The paper states 'that 11 cases apples, two cases oranges, and one case lemons, were sent from here. This is incorrect, the shipment contained six cases apples, 3 cases mandarins, two cases oranges, and one case lemons. It is interesting to note that the apples arrived in good condition and that they were all properly packed.

"This article further states that the fruit should be shipped in cases containing 40lbs. of fruit, and that remarks are made that this has been reported over and over again. Since we have been sending fruit to London, however, it has always been packed in dump cases, such as are used for export purposes by all the other Australian States. These cases have been specially made here for us for the purpose of packing this export fruit. These dump cases hold approximately 40lbs., the weight is marked on every case when sent away and varies from 36 to 42lbs., or an average of 40lbs. It is absolutely impossible to guarantee every case of fruit to balance the scale of 40lbs., unless we use a case much larger for the purpose and fill it up with paper. Various sizes of apples pack into the cases differently ; if the apples are small and fit well in, we can get two or three pounds more per case than if they are somewhat larger. We have been asked over and over again to pack our apples in the proper export cases holding 40lbs., and we have done so and the apples sent in this shipment were sent in these cases.

"With regard to the mandarins, the paragraph states:—'It is suggested that the fruit be wrapped in white tissue paper and packed in boxes of two compartments, each compartment to contain three layers of 25 fruits, thus making 150 fruits in a box.' The mandarins that were sent were packed in trays, containing 24 fruits on a tray and six trays to a box, and the number was marked on the outside of the box.

"It is also suggested that oranges should be sent in cases containing 150. The ordinary export cases which we have also been told to use will only contain from five to seven dozen oranges, according to size, consequently, if we have to pack 150 oranges in a case, we should have to use cases nearly double the size of the present export case.

"We have now practically finished sending fruit away for this season, and if we are to use different cases to what the other Australian States are using and which in all previous correspondence we have been advised to use, it will be necessary to get some information from the Agent General on this subject before next fruit season."



Paspalum Paddock on Mr Munroe's property. Palinup, Broome Hill.

FEDERAL BOUNTIES.

Under the Federal bounties Bill recently passed in the Federal Parliament the following is the schedule of bounties:—

For cotton, ginned, for eight years from July 1, 1907, at 10 per cent. on market value; maximum amount in one year, £6,000.

Fibres—New Zealand flax, for 10 years, at 10 per cent., £3,000.

Flax and hemp for five years, 10 per cent., £8,000.

Jute, for five years, 20 per cent., £9,000.

Sisal hemp, for 10 years, 10 per cent., £3,000.

Mohair, for 10 years 10 per cent., £2,000.

Oil materials supplied to an oil factory—Copra, 15 years, 15 per cent., £5,000.

Cotton Seed, for eight years, 10 per cent., £5,000.

Linseed (flax seed), for five years, 10 per cent., £1,000.

Rice, uncleaned, for five years, 20s. per ton, £1,000.

Rubber, for 15 years, 10 per cent., £2,000.

Coffee, raw, for eight years, 1d. per lb., £1,500.

Tobacco leaf for the manufacture of cigars, high grade, for five years, 2d. per lb., £4,000.

Fish, preserved, for five years, ½d. per lb., £10,000.

Dates, for 15 years, 1d. per lb., £1,000.

Dried fruits (except currants and raisins), or candied, and exported, for five years, 10 per cent. on market value, £6,000.

Coombed wools or tops, exported for two years, commencing from July 1, 1908, 1½d. per lb.; for three years thereafter, 1d. per lb. Total, £10,000.

GOVERNMENT LABOUR BUREAU.

REPORT FOR AUGUST.

The following is the report of the Superintendent of the Government Labour Bureau on the operations of the Bureau for August:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 741. Of this number 389 were new registrations and 352 renewals, *i.e.*, men who called who had been registered during the year prior to the month of August. The trades or occupations of the 741 applicants were as follows:—Labourers, 174; handymen, 75; bushmen, 62; farm hands, 62 ; handy lads, 55 ; carpenters, 36 ; cooks, 36 ; shearers, 29 ; gardeners, 16 ; painters, 14 ; drivers, 12 ; blacksmiths, 11 ; miners, 10 ; hotel hands, 9 ; dairymen, fitters, and yardmen, 8 of each ; butchers, bricklayers, engine-drivers, and grooms, 7 of each ; clerks, 6 ; kitchenmen, 5 ;

teamsters, 5 ; bakers, plumbers, survey hands, station hands, and sawmill hands, 4 of each ; caretakers, engineers, firemen, and orchardists, 3 of each ; and 40 miscellaneous.

Engagements.—The engagements for the month totalled 242. The classification was as follows:—Bushmen, 57; labourers, 40; farm hands, 29; handymen, 29; shearers, 12; cooks, 7; horse drivers, 7; handy boys, 6; gardeners, 5 ; orchardists, 5 ; kitchenmen, 4 ; woodcutters, 4 ; bricklayers, blacksmiths, and carpenters, 3 of each ; carpenters (rough), dairymen, groom-gardeners, grooms, married couples, shepherds, and teamsters, 2 of each ; and 14 miscellaneous.

Kalgoorlie.

Registrations.—The applicants for work numbered 62. There were 30 new registrations and 32 renewals. The classification was as follows :—Handymen, 17 ; labourers, 13 ; handy youths, 6 ; miners, 5 ; blacksmiths, 4 ; engine-drivers, 3 ; carpenters, 3 ; cooks, canvassers, and yardmen, 2 of each ; boilermakers, fitters, barmen, hairdressers, and clerks, 1 of each.

Engagements.—There were 5 engagements, viz.:—Miners, 3; labourer, 1; and yardman, 1.

The female servants who called numbered 32. The new registrations numbered 15, and the renewals 17. The classification was as follows:—Generals, 9 ; housemaids, 6 ; light generals, 4 ; charwomen, laundresses, and waitresses, 3 of each; cooks, 2; housekeeper, 1; and kitchenwoman, 1. There was one engagement—a general.

Northam.

Registrations.—The registrations for the month numbered 5, viz. :—Farmhands, 2 ; labourers, 2 ; and cooks, 1.

Engagements.—There were two found employment—two farm hands.

Women's Branch, Perth.

Registrations.—There were in connection with this branch 74 registrations and 66 renewals. The classification was as follows :—Generals, 31 ; housemaids, 25 ; laundress charwomen, 19 ; cooks, 16 ; light generals, 9 ; nursemaids, 9; useful girls, 8; housekeepers, 8; waitresses, 7; lady-helps, 4 ; and 4 miscellaneous.

Engagements.—The engagements numbered 57. The classification of work found is as follows:—Laundress-charwomen, 22; generals, 20; light generals, 4; cooks, 3; useful girls, 2; lady-helps, 2; and 4 miscellaneous.

General Remarks.

The number of men who called at the central office, Perth, during the month in search of work was 741, being one short of the total for July, and 76 less than that for the month of August of last year. The engagements were 242, all of which were by private persons, the unmber is 102 in excess of that for July, and 28 in excess of the total for August last year. There were 165 for country districts, and 77 for town. During the month there were 73 men assisted by railway passes from the central office, Perth. The fares refunded totalled £13 17s. 11d., and the sum of £14 5s. 5d., was received from employers to send men, also £8 6s. 11d. to send women. At

Kalgoorlie branch, 7 men were assisted by passes, and the sum of £6 9s. 11d. was refunded. The whole amounting to £43 0s. 2d.

At the women's branch, Perth, 140 women called during the month. As compared with the previous month the number is 30 less, and 61 short of that for the month of August last year. The engagements were 57, being 3 short of the number for July, and 17 less than that of August last year.

At Kalgoorlie branch the applicants for work were 94 (62 men and 32 women), and at Northam branch, 5 men. The engagements at Kalgoorlie were 6 (5 men and 1 woman), and at Northam two.

LOCAL MARKET REPORT.

Market Report of the W.A. General Produce Company for the month ending Wednesday, 11th September, 1907:—Business during the week has been fairly good. Supplies are still irregular, and values continue changeable. Detail of particulars as follows: Bacon very scarce both on spot and sources of supplies; values have increased considerably. Hams: usual supplies and demand. Butter: good supplies of Victorian fresh made, but still large quantities of store lots on spot. Cheese supplies very poor, and values remain firm. Eggs: large quantities of country lots arriving daily and selling at a level with imported, tending thereby to minimise importation. Potatoes: imported lots very plentiful, selling cheap; local lots of good size and condition sell well. Onions: good supplies, values unaltered. Chaff: good supplies, selling below farmers' expectations. Millers' lines continue firm, but no immediate increase in values expected. Fruit: fairly good supplies for the time of year; values very good. Vegetables still on the scarce side, and values ruling are all that could be desired by the growers. Poultry: good young fleshy lots for killing purposes in good demand, especially fat ducks. Carcase pork, if of medium weights and cleanly dressed, sells well.

Farm and Dairy Produce.—Bacon, 9½d. to 10½d. per lb. Hams, 1s. to 1s. 1½d. Butter: best Victorian, 1s. 1d.; stored lots from 9d. to 11d. Lard in 1lb. packets, 8d. Cheese, medium, 9d.; loaf size, 9½d. Eggs, country lots, 8½d. to 10d. dozen. Potatoes, imported, £5 ton; country, £6 to £9 per ton. Onions, 6s. per cwt. Chaff, from £2 12s. 6d. to £3 17s. 6d. ton. Bran and pollard, £5 12s. 6d. to £6 ton. Flour, local, £8 10s. to £8 15s. Oats, white, 3s. 6d. to 3s. 7d.; Algerian, 3s. 3d. to 3s. 5d. Maize, whole, worth 4s. 6d. Wheat, truck lots, 3s. 7d. to 3s. 9d. bushel. Oil cake, £8 10s. per ton.

Fruit.—Oranges, navel, from 8s. 6d. to 15s. per case; ordinary, from 6s. 6d. to 13s. per case. Lemons, 6s. to 8s. 6d. per case. Mandarines, from 8s. 6d. to 19s. per case. Loquats, from 7s. 6d. to 14s. per case. Bananas, from 18s. to 22s. 6d. per case. Passion fruit, 6d. per dozen. Cape Gooseberries, 4d. to 5d. per lb. Apples, Cleopatras, 8s. to 12s. per case; Rokewoods, 10s. 6d. to 14s. per case; Nikajacks, 11s. to 13s. 6d. per case; Stermers, 9s. 6d. to 12s. per case; Stone pippins, 8s. 6d. to 10s. per case.

Vegetables.—Cabbage, ordinary, from 6s. to 14s. 6d. per cwt.; Savoy, from 9s. to 15s. per cwt.; red, from 11s. 6d. per cwt. Cauliflowers, from 4s. 6d. to 11s. per doz. Parsnips, from 1s. 3d. to 1s. 8d. per doz. bunches. Turnips, white, from 6d. to 1s. per doz. bunches; swedes, from 1s. 3d. to 1s. 10d. per doz. bunches; swedes, bulk, 7s. 6d. per cwt. Marrows, worth 3s. 6d. to 4s. 6d. per dozen. Pumpkins, 11s. to 14s. per cwt. Rhubarb, 1½d. to 2½d. per lb.

Salads and Herbs.—Lettuce, 1s. 6d. to 2s. 6d. per quarter bag. Spring onions, 6d. to 9d. per bundle. Beetroot, 9d. to 1s. 3d. per doz bunches. Celery, 1s. to 2s. 9d. per doz. heads. Cress, 1s. per bundle. Radishes, 6d. to 9d. per doz. bunches. Thyme, marjoram, and sage, 2s. 6d. to 3s. per tray. Mint and parsley, 4d. to 6d. per bundle.

Poultry (for killing).—Fowls, prime killing, 5s. to 6s. 6d. pair; good and medium, from 4s. pair. Chickens, 3s. 6d. pair. Ducks, from 7s. to 9s. Geese, worth 8s. to 10s. Turkeys, Gobblers, from 14s. 6d. to 18s. 6d.; hens, from 8s. to 10s. 6d.

Carcase Meat.—Pork, medium weight, from 5d. to 6½d. lb. Lamb, dressed, 12s. 6d. to 15s. each.

Sundries.—Corn sacks, second-hand, 5s. 6d. dozen. Bran bags, second-hand, 4s. 6d. dozen. Bonedust, £7 10s. ton. Phosphate, £5 10s. ton. Guano, phosphatic, £4 10s. Guano, ammonical, £5 10s. Ammonia, 20s. per cwt. Nitrate of potash, 17s. per cwt.

FARM NOTES FOR OCTOBER.

By Percy G. Wicken.

Since writing the previous month's notes a Producers' Conference was held in Perth, and at this conference a number of interesting papers, by men of practical experience, were read and discussed by the delegates. Such meetings cannot fail to be of benefit to those who attend, and by the publication of papers and discussion thereon other settlers are enabled to gain information from the views expressed by those attending the conference.

This winter has been an excessively wet one, the rain during July constituting a record, consequently in the South and South-West portions of the State the ground is still very moist and the crops somewhat backward. With the return of fine weather, however, crops will, no doubt, make rapid growth, and provided that no further falls of rain are experienced crops may yet be up to the average. The excessive rainfall has prevented many settlers from doing as much fallowing as they had intended. Settlers are realising year by year the advantages to be gained by fallowing land, and last season there was a record of fallow land sown.

Next season it is doubtful whether there will be as much, as the ground has been so wet that it has not been possible to get the teams to work, and there is every probability of the ground becoming too hard for ploughing before they are able to get the full area done.

We have often written about the value of field peas in the coastal districts of this State for the purpose of food, or for turning under as a green manure. At the present time many examples of good crops of peas can be seen. Mr. A. J. Harris of Wanneroo has, on a sample of very poor soil, an excellent crop of these peas which were grown with the aid of a little farmyard manure. The cultivation of field and garden peas during the winter months, and cow peas and soy beans during the summer, are the best means of adding fertility to the soil.

It is now the season for Agricultural Shows. The first display of the season was held by the Victoria Plains Farmers' Association at the Yarrawonda Hall on August 28th. Although only a small show, very great interest was taken in it by local residents, and although there were only two visitors from outside the district nearly 200 people were present in all. The exhibits included wheat, barley, oats, green fodders, dairy, farm, and garden produce, fruits, etc. There were a fair number of entries, and very good produce was shown.

On the day following the show a ploughing match was held in the grounds of the New Norcia Mission, at which both single and double furrow implements competed for the prize.

A show at the Irwin will be held on the 25th inst., and the National show, which is this year being held at Northam, takes place on Tuesday and Wednesday, the 1st and 2nd of October. The local society is doing its very best to make this show a success, and a large number of visitors will probably attend.

From this date on to November 21st, which is the date of the Bridgetown show, there are two or three shows every week.

In the further eastern districts the hay harvest will commence early this month, although perhaps it will be a week or two later than usual, especially if the warm weather keeps off.

All reapers and binders, strippers and harvesters, should be overhauled and put in condition to start work at a minute's notice. Any necessary parts likely to be required to repair breakages, etc., should be obtained and kept on hand so that no delay occurs at the harvest.

When hay-cutting starts it is a good plan to cut a strip round all the paddocks which are being kept for grain, cart the hay off, and plough up the strip; this will then act as a fire-break, and may save the crop from destruction should a fire break out in the vicinity. As the grass becomes dry the York Road poison sends up its shoots; and it is at this period that it is most dangerous to stock. A sharp look-out should therefore be kept in the paddocks for any young poison plants, and these should be grubbed out immediately they are discovered.

In the cooler Southern and South-Western districts such crops as 90-day maize, melons, pumpkins, sorghum, cow peas, soy beans, mangels, sugar-beet, and pearl millet may be sown on well prepared soil. These plants should all be sown in drills at least three feet apart, so that a cultivator may be kept going between the rows. To obtain the best results the cultivator should be kept going almost continuously during the hot weather, and if plants grown for summer fodder are cultivated say once a fortnight they will benefit greatly by the attention given them.

In the Eastern districts the choice of crops is much more restricted, and attention should be paid to growing crops of fodders during the winter months and converting them into silage for use during the dry weather.

Mangel wurzel is a crop which should receive more attention from farmers in the Southern districts. It is a very valuable fodder both for cattle, sheep, and pigs, and if a surplus number of roots are obtained at any time they can be stored until required. The land should be worked up to a fine tilth, and the seed, after being previously soaked, should be planted in rows three feet apart and covered to a depth of about one inch. As the young plants come up they should be thinned out to a distance of 18 inches to two feet apart, and all weeds deleted by means of a hoe. As soon as the plants are about 6 inches high the cultivator should be run through the ground, care being taken that no lumps of earth are knocked on to the young plants. Mangels are a gross feeder, and a quantity of fertiliser containing a large percentage of nitrogen should be supplied.

Sugar beets, if grown for feed purposes can be cultivated in the same manner as mangels, but if grown for the percentage of sugar they should be put in rows 16 inches apart and about 6 to 8 inches in the rows, as any beet weighing over 2 lbs. is not acceptable to the factory owing to its low content of sugar; consequently the object is to produce as many beets of a small size as possible from a given area of land.

The attention of settlers is again called to the provision of "The Fertiliser and Feeding Stuffs Act," by which all vendors are required to register their fertilisers and to supply an invoice certificate at time of sale, stating to the purchaser the contents of the fertiliser. Samples of all fertilisers on the market are taken by the inspectors from time to time and the result of the analysis, together with the registered percentages, published in this Journal. From these returns, with the unit value of fertiliser attached, farmers are able to ascertain before purchasing their fertiliser the relative value of the different samples offered to them. About 170 of these results have now been published, including practically all manures offered for sale in this State. Further samples will be taken from time to time and the lists published for general information. Up to the present it has not been possible to put into practice the provisions of the feeding stuffs section of this Act; however, arrangements for this part of the work have been made, and samples of all feeding stuffs on the market will be shortly secured.

Section 10 of the Fertiliser and Feeding Stuffs Act states:—

> "(1.) Every person who sells, for use as food for cattle, any article which has been artificially prepared, shall give to the purchaser an invoice certificate stating the name of the article, the percentages of nutritive or other ingredients contained therein, and whether it has been prepared from one substance or seed, or from more than one substance or seed, and such invoice shall have effect as a warranty by the seller of the statements contained therein.
>
> "(2.) Where any article sold for use as food for cattle is sold under a name or description implying that it is prepared from any particular substance, or from two or more particular substances, or is the product of any particular seed, or of two or more particular seeds, and without any indication that it is mixed or compounded with any other substance or seed, there shall be an implied warranty by the seller that it is pure, that is to say, is prepared from that substance or those substances only, or is a product of that seed or those seeds only.

> "(3.) On the sale of any article for use as food for cattle, there shall be implied a warranty by the seller that the article is suitable for feeding purposes.
>
> "(4.) Any statement by the seller of the percentages of nutritive or other ingredients contained in any article sold for use as food for cattle, made in an invoice certificate of such article, or in any circular or advertisement descriptive of such article, shall have effect as a warranty by the seller."

The following is the form in which the invoice certificate is to be supplied by the vendor to the purchaser of any feeding stuff, and all settlers purchasing any feed for stock should see that they are supplied with an invoice certificate in the accompanying form, and in the event of the seller failing to do so the purchaser should communicate with the Department of Agriculture.

[Form D.]

WESTERN AUSTRALIA.

Fertilisers and Feeding Stuffs Act, 1904
(Section 10).

INVOICE CERTIFICATE ON SALE OF FEEDING STUFFS.

Name of Seller. I, ...,
Place of business of Seller. of ....,
hereby certify that on the....................day of...........................,
Quantity sold. 190 .., ...
of the feeding stuff known as..
was sold by me to.. and contains the minimum percentages of constituent ingredients enumerated below:—

	Minimum Percentage.
Moisture	
Ether Extract	
*Protein	
Fibre	
Nitrogen free extract ... ... (by difference)	
†Sugars, reducing .. .. (expressed as glucose)	
†Sugars, non-reducing ... ... (expressed as cane sugar) ...	

And that the said Feeding Stuff is made from....................................
.... only (or) is made from a mixture of
.... and ....

Dated the.................. day of ...., 190 .

Signature of Seller or his Agent..............................

---

* Containing Nitrogen per cent.

† These estimations are optional, to be used only in describing special preparations depending for their value on sugar contents. In such cases "Nitrogen free Extract by difference" will mean "exclusive of Sugars."

NOTES ON THE CLIMATE FOR THE MONTH OF AUGUST, 1907.

This has been an exceptionally severe winter in S.W. districts, "low" after "low" passing along the Southern Ocean from West to East, and keeping the weather almost perpetually squally, with high seas. The record spell of wet weather for Perth broke up on the 16th. Rain was recorded on every day between July 18 and August 16, the total fall for the 30 days being 11.02 inches. Prior to this the longest period of continuous wet weather was in 1885, when 6.05 inches fell on 23 successive days. It did not remain fine for very long even at the conclusion of this record period, but from that time forward it was generally felt that the worst of the winter was over; and on the 28th the first "low" of a summer type approached the western coast near Sharks Bay, coming down the Indian Ocean, rounded the Leeuwin, and moved rapidly Eastward. On the 29th the temperature at every station throughout the Coolgardie and Murchison goldfields was higher than has ever before been experienced in August, the maximum being 89 deg. at Menzies and Kalgoorlie.

On the whole the rainfall was in excess of the average throughout S.W. districts, but light elsewhere; and, as usual at this season, none fell in the tropics.

Pressure was below normal all South of the tropics, and in the extreme S.W. was the lowest on record.

Temperature was generally slightly above the average, but on the Coolgardie fields and S.E. district it was much above the normal, being in most cases the highest on record for August.

Very few frosty nights were recorded. The following table shows the mean of the daily and the lowest readings of a minimum thermometer placed on the surface of the ground:—

Station.	Mean.	Lowest.	Date.	Station.	Mean.	Lowest.	Date.
Peak Hill ...	44·0	34·0	7	Perth Observatory	48·0	36·8	23
Cue	41·2	33·0	2	Wandering ..	38·2	27·5	21
Coolgardie ...	39·3	30·9	20	Bridgetown ...	39·3	33·0	31
Southern Cross ...	38·0	38·0	20, 21	Karridale ...	47·0	36·8	22
Walebing ...	38·4	29·0	21	Katanning ...	40·3	33·0	21
York	43·3	35·5	21	Mt. Barker ...	40·9	34·0	31

W. E. COOKE,
Government Astronomer.

The Observatory,
Perth, 10th September, 1907.

The Climate of Western Australia during August, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						August, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
North-West and North Coast:	Wyndham	29·980	30·007	30·121	29·838	89·4	70·2	79·8	95·8	65·0	89·2	69·3	97·7	56·1	*Nil*	...	1,892
	Derby	30·011	30·008	30·185	29·901	88·2	58·6	73·4	95·6	48·0	89·0	60·2	98·6	45·2	*Nil*	...	2,394
	Broome	29·994	30·016	30·146	29·848	85·0	59·4	72·4	93·2	52·0	85·4	59·8	98·8	43·0	*Nil*	...	2,296
	Condon	30·040	30·054	30·233	29·908	82·3	50·5	66·4	94·0	42·5	80·7	53·6	95·2	38·0	*Nil*	...	1,011
	Cossack	30·045	30·064	30·170	29·920	83·0	62·0	72·5	96·0	54·0	80·4	56·8	92·2	45·8	*Nil*	...	2,028
	Onslow	30·065	30·068	30·200	29·959	81·5	54·5	68·0	94·8	46·0	79·1	53·3	92·9	40·0	*Nil*	...	874
	Winning Pool	30·093	...	30·243	29·962	...	...	...	...	...	...	...	...	...	5	1	1,174
	Carnarvon	30·134	30·116	30·273	...	72·6	53·8	63·2	79·0	35·0	72·8	52·5	90·2	39·8	35	3	1,118
	Hamelin Pool	30·111	30·112	30·303	29·970	70·6	49·5	60·0	79·6	38·6	71·4	48·6	83·0	35·7	35	5	837
	Geraldton	30·112	30·139	30·409	29·878	69·8	54·6	62·2	75·5	39·6	69·1	50·3	84·8	37·3	197	4	2,123
Inland:	Hall's Creek	30·037	30·000	30·245	29·878	86·5	48·8	67·6	91·8	37·8	85·8	52·3	95·2	32·8	*Nil*	...	1,747
	Marble Bar	...	...	...	...	86·5	54·8	70·6	95·7	43·0	85·0	55·7	96·3	39·0	*Nil*	...	983
	Nullagine	30·072	30·084	30·243	29·928	82·9	45·2	64·0	93·0	35·0	79·1	48·2	94·0	30·1	*Nil*	...	873
	Peak Hill	30·108	30·122	30·375	29·896	73·2	48·8	61·0	86·7	40·0	69·6	47·1	83·8	36·4	35	3	835
	Wiluna	30·080	30·138	30·353	29·824	72·6	44·0	58·3	87·0	36·0	68·3	43·1	85·8	29·3	*Nil*	...	670
	Cue	30·084	30·146	30·377	29·920	70·8	46·8	58·8	88·0	40·0	68·7	45·6	86·0	31·0	31	4	735
	Murgoo	...	...	..	...	69·2	45·6	57·4	86·0	38·5	...	...	...	...	37	4	798
	Yalgoo	30·110	30·138	30·384	29·898	66·9	45·4	56·2	85·9	36·8	67·7	44·2	85·3	31·5	76	4	780
	Nunngarra	30·114	...	30·426	29·843	68·3	44·7	56·5	88·0	35·0	...	...	...	...	52	4	724
	Lawlers	30·109	30·148	30·408	29·787	70·5	44·6	57·6	88·6	34·0	67·1	44·6	85·2	28·2	60	3	786
	Laverton	30·067	30·178	30·375	29·730	71·1	44·6	57·8	87·6	32·8	66·6	43·2	87·1	29·8	28	1	746
	Menzies	30·061	30·149	30·401	29·745	68·4	43·4	55·9	88·5	35·0	65·1	44·1	83·8	29·7	81	6	607
	Kanowna	...	...	...	..	67·3	42·7	55·0	86·8	36·0	63·3	42·2	76·9	33·4	55	5	848
	Kalgoorlie	30·047	30·152	30·410	29·770	68·0	45·0	56·6	87·0	36·2	64·6	44·3	82·0	34·0	53	6	913
	Coolgardie	30·048	30·152	30·425	29·714	66·5	43·3	54·9	85·2	35·4	64·2	43·0	81·0	31·2	56	8	1,014
	Southern Cross	30·066	30·133	30·433	29·740	67·5	42·2	54·8	86·0	30·4	64·7	40·7	81·0	25·0	79	8	828
	Kellerberrin	...	..	...	...	..	.	...	...	..	...	...	.	...	210	12	1,038
	Walebing	..	...	..	...	63·8	43·4	53·6	77·0	34·0	63·3	41·4	78·9	30·4	362	18	2,051
	Northam	...	...	...	...	64·9	45·7	55·3	72·1	35·5	64·6	40·4	80·1	31·2	308	18	1,715
	York	30·068	30·146	30·435	29·779	65·6	45·6	55·6	75·0	35·0	63·9	41·2	79·1	29·8	292	20	1,648
	Guildford	...	...	...	...	65·8	50·1	58·0	71·5	42·0	65·7	44·8	81·6	30·2	644	21	3,110

The Climate of Western Australia during August, 1907—*continued*.

Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
					August, 1907.					Average for previous Years.						
	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
SOUTH-WEST AND SOUTH COAST:																
Perth Gardens	30·046	30·116	30·377	29·698	65·7	52·5	59·1	70·4	42·2	65·0	47·2	79·7	33·6	567	23	3,098
Perth Observatory ...	30·052	30·140	30·404	29·710	64·4	51·8	58·1	70·0	42·7	63·9	47·8	80·4	37·5	559	25	3,237
Fremantle	30·060	30·130	30·407	29·774	63·8	54·8	59·3	69·0	46·2	64·1	50·7	77·3	41·0	401	23	3,055
Rottnest	30·042	30·117	30·391	29·764	63·8	54·4	59·1	66·5	46·5	62·8	53·1	76·2	43·5	313	22	2,149
Mandurah	...	...	..	...	63·3	50·9	57·1	66·6	38·2	64·2	45·0	76·9	32·7	672	21	3,928
Marradong	...	..	...	...	..	...	...	...	...	...	...	...	...	614	16	2,329
Wandering	...	...	...	..	61·6	43·4	52·5	69·0	32·1	60·9	37·2	72·9	28·2	509	21	2,127
Narrogin	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Collie	...	...	...	...	61·2	44·3	52·8	66·0	34·8	61·5	38·1	75·7	27·5	723	23	2,701
Donnybrook	...	...	...	...	62·0	46·5	54·2	68·0	37·0	63·2	43·4	74·2	29·4	694	23	3,138
Bunbury	29·996	30·131	30·385	29·690	63·4	52·4	57·9	67·9	39·8	63·9	46·7	75·5	33·2	542	23	2,623
Busselton	...	...	...	...	63·0	49·1	56·0	65·8	38·2	62·3	44·8	73·8	33·6	625	23	2,866
Cape Naturaliste ...	29·962	...	30·326	29·591	61·6	52·6	57·1	66·0	45·8	...	...	...	...	456	25	3,133
Bridgetown	...	...	...	...	62.7	44·1	53·4	67·9	37·9	62·0	39·2	75·9	28·2	694	24	2,554
Karridale	29·942	30·106	30·311	29·612	62·5	52·1	57·3	67·0	42·1	61·8	46·3	74·4	32·5	605	25	4,166
Cape Leeuwin	29·883	30·068	30·292	29·378	62·2	54·6	58·4	66·3	45·2	61·5	52·4	72·3	43·8	540	26	3,815
Katanning	29·982	30·122	30·347	29·595	60·5	44·7	52·6	71·5	37·7	59·9	41·1	75·1	30·4	286	19	1,518
Mt. Barker	...	...	..	...	59·9	44·1	52·0	70·0	38·0	...	...	...	...	484	22	2,404
Albany	29·883	30·085	30·280	29·417	63·3	50·6	57·0	74·3	43·0	61·4	45·8	77·5	34·3	623	22	2,720
Breaksea...	29·890	30·081	30·314	29·357	60·5	49·8	55·2	71·5	39·8	59·4	49·7	74·8	34·5	619	22	2,756
Esperance	29·990	30·118	30·410	29·690	67·0	48·0	57·5	89·0	39·0	63·6	46·3	82·8	33·3	505	14	1,959
Balladonia	29·980	30·172	30·355	29·601	68·3	43·0	55·6	85·8	34·1	63·9	41·0	83·0	28·0	66	8	765
Eyre	29·963	30·155	30·288	29·596	69·6	45·4	57·5	87·6	34·0	64·7	43·8	88·7	29·1	84	8	891
INTERSTATE.																
Perth*	30·052	30·140	30·404	29·710	64·4	51·8	58·1	70·0	42·7	63·9	47·8	80·4	37·5	559	25	3,237
Adelaide	29·960	30·125	30·410	29·530	62·3	46·6	54·4	73·3	39·9	62·0	45·8	82·0	32·3	181	16	1,437
Melbourne	29·888	29·981	30·216	29·483	60·1	45·2	52·6	66·7	38·5	58·8	43·2	77·0	28·3	197	18	1,240
Sydney	30·000	30·103	30·270	29·510	65·0	47·0	56·0	75·0	42·0	62·2	47·5	82·0	36·8	29	4	2,666

* Averages for three years only.

The Observatory, Perth, 10th September, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for July, 1907 (completed as far as possible), and for August, 1907 (principally from Telegraphic Reports).

STATIONS.	JULY, 1907.		AUGUST, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham ...	21	2	*Nil*	...
6-Mile	...	...	...	...
Carlton	...	...	...	...
Ivanhoe	*Nil*	...	...	...
Argyle Downs ...	18	2	...	...
Rosewood Downs	30	1	3	1
Lisadell	...	...	...	..
Turkey Creek ...	*Nil*	...	*Nil*	.
Ord River ...	...	...	...	..
Alice Downs ...	...	...	...	...
Flora Valley ...	*Nil*	...	...	...
Hall's Creek ...	*Nil*	...	*Nil*	...
Nicholson Plains	...	...	..	...
Ruby Plains ...	...	...	...	...
Denison Downs	...	...	...	...
WEST KIMBERLEY:				
Mt. Barnett ...	...	...	...	..
Mt. House ...	5	1	...	...
Leopold Downs...	*Nil*	...	...	...
Fitzroy Crossing (P.O.)	21	1	*Nil*	...
Fitzroy Station...	...	...	...	...
Brooking ...	...	...	...	...
Cherrabun ...	...	. .	...	...
Bohemia Downs	...	...	...	...
Quanbun ...	11	1	...	...
Nookanbah ...	...	...	..	...
Upper Liveringa	30	1	...	...
Yeeda	25	1	...	...
Derby	56	1	*Nil*	...
Pt. Torment ...	*Nil*	...	...	...
Obagama ...	195	2	...	...
Beagle Bay ...	136	1	...	...
Roebuck Downs	...	...	...	...
Kimberley Downs	...	...	...	...
Broome	85	1	*Nil*	...
La Grange Bay...	150	1	3	1
N.W. COAST:				
Wallal	22	2	*Nil*	...
Pardoo	98	3	...	...
Condon	118	3	*Nil*	...
DeGrey River ...	67	2	...	...
Port Hedland ...	65	5	15	1
Boodarie ...	...	...	...	...
Whim Creek ...	62	3	*Nil*	...
N.W. COAST—*contd.*				
Mallina	76	2	...	...
Croydon	93	3	*Nil*	...
Sherlock... ...	...	...	...	...
Woodbrooke ...	..	...	...	...
Cooyapooya ...	58	2	...	...
Roebourne ...	35	2	5	1
Cossack	31	2	*Nil*	...
Fortescue ...	35	5	*Nil*	...
Mardie	74	5	...	...
Chinginarra ...	84	5	...	...
Yarraloola ..	...	...	..	...
Peedamullah ...	59	3	...	...
Onslow	98	3	*Nil*	...
Point Cloates ...	...	...	..	...
N.W. INLAND:				
Ethel Creek ..	...	...	...	..
Warrawagine ...	...	...	. .	..
Eel Creek ...	...	...	...	...
Muccan	...	...	...	...
Ettrick	...	...	...	...
Strelly	..	...	...	...
Carlinda	38	3	*Nil*	...
Mulgie	...	...	...	...
Warralong ...	40	2	*Nil*	...
Coongon ...	...	...	...	...
Talga	...	...	...	...
Bamboo Creek ...	98	3	*Nil*	...
Moolyella ...	..	...	...	...
Marble Bar ...	139	3	*Nil*	...
Warrawoona ...	50	1	...	...
Corunna Downs	111	5	...	...
Mt. Edgar ...	53	2	...	...
Nullagine ...	176	5	*Nil*	...
Bonny Downs ...	80	2	...	...
Middle Creek ...	167	4	...	...
Mosquito Creek	...	...	...	...
Roy Hill ...	168	4	...	...
Bamboo Springs	...	...	...	...
Kerdiadary ...	105	2	...	...
Woodstock ...	72	2	...	...
Yandyarra ...	93	3	...	...
Station Peak ...	...	...	...	...
Mulga Downs ...	72	2	...	...
Mt. Florence ...	...	...	...	...
Tambrey ...	75	2	...	...
Millstream ...	80	3	*Nil*	...

RAINFALL—*continued.*

STATIONS.	JULY, 1907.		AUGUST, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. INLAND—*contd.*				
Red Hill	69	2	...	...
Mt. Stewart	...	...	...	...
Coorara	84	4	...	...
Peake Station	120	3	...	...
Nanutarra	...	...	...	...
Zaurey	108	4	...	...
Towara	98	5	...	...
GASCOYNE:				
Winning Pool	119	4	5	1
Coordalia	...	...	...	...
Wandagee	...	...	...	...
Williambury	158	4	...	...
Yanyeareddy	...	...	...	...
Maroonah	135	3	...	...
Ullawarra	66	2	...	...
Mt. Mortimer	...	...	...	...
Edmunds	124	4	.	...
Gifford Creek	56	1	. .	...
Bangemall	...	...	...	...
Mt. Augustus	130	3	...	...
Upper Clifton Downs	217	5	..	. .
Clifton Downs	...	..	..	...
Mearerbundie	...	...	...	...
Byro	...	...	...	...
Meedo	235	7	. .	...
Minnie Creek	167	4	..	...
Bintholya	...	...	.	
Lyon's River	169	5	..	...
Mangaroon	...	...	...	. .
Booloogooroo	208	5	.	...
Junction Station	240	5	...	...
Doorawarrah	257	6	..	.
Brick House	296	6	...	...
Boolathana	254	8	...	...
Carnarvon	255	5	35	3
Point Charles	284	10	...	...
Dirk Hartog	...	...	..	...
Sharks Bay	373	7	37	2
Wooramel	283	7	35	3
Hamelin Pool	264	9	35	5
Kararang	433	12	..	...
Tamala	455	16	...	...
YALGOO DISTRICT:				
Woolgorong	255	7	...	...
New Forest	221	6	...	...
Yuin	336	5	86	7
Pindathuna	272	7	..	...
Tallyrang	368	13	...	...
YALGOO DISTRICT—*contd.*				
Bindoo	...	...	77	3
Mullewa	383	12	144	8
Kockatea	327	8	..	...
Barnong	376	9	100	8
Gullewa	292	7	87	...
Gullewa House	353	11	116	9
Gabyon	262	7	133	6
Mellenbye	302	11	95	7
Wearagaminda	238	10	107	6
Yalgoo	226	8	76	4
Wagga Wagga	233	12	...	...
Muralgarra	189	7	...	...
Golden Grove	224	7	...	...
Burnerbinmah	232	13	93	9
Nalbara	199	8	...	...
Wydgee	228	7	..	...
Field's Find	166	6	48	5
Thundelarra	205	8	98	8
Rothesay	...	...	..	...
Ninghan	328	8	...	...
Condingnow	228	9	...	...
163-Mile	259	8		...
126-Mile	234	8	..	...
90-Mile	260	...	92	...
Wilgoyne	207	10	...	...
Mt. Jackson	213	8	63	3
MURCHISON:				
Wale	215	6	...	...
Yallalonga	...	..	..	...
Billabalong	...	...	...	...
Twin Peaks	...	..	...	...
Murgoo	189	6	37	2
Mt. Wittenoom	235	5	...	...
Meka	206	6	...	...
Wooleane	170	6	...	...
Boolardy	...	...	...	...
Yederadda	131	4	...	...
Woogorong	124	6	..	...
Manfred	134	5	...	...
Yarra Yarra	177	7	...	...
Milly Milly	133	4	...	...
Berringarra	...	...	...	...
Mileura	162	4	...	...
Mt. Gould	...	...	...	...
Moorarie	65	2	...	...
Peak Hill	154	7	35	8
Minderoo	...	...	...	...
Abbotts	131	3	10	1
Belele	...	...	...	...

RAINFALL—*continued.*

STATIONS.	JULY, 1907.		AUGUST, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
MURCHISON—*contd.*				
Gabanintha ...	121	4	27	3
Bungalow ...	185	4	...	...
Nannine	109	3	31	3
Annean	106	4	15	2
Tuckanarra ...	104	4	35	2
Coodardy ...	83	4		...
Austin Downs ...	118	6	56	3
Cue	134	6	31	4
Day Dawn ...	131	5	20	3
Lake Austin ...	193	5	37	2
Lennonville ...	205	9	69	7
Mt. Magnet ...	156	6	50	4
Youeragabbie ...	185	7	...	...
Murrum	157	4	...	...
Challa	169	6	57	4
Nunngarra ...	99	7	52	4
Berrigrin ...	104	3	...	...
EAST MURCHISON:				
Gum Creek ...	100	3	..	...
Dural	152	6	...	...
Wiluna	154	6	*Nil*	...
Mt. Sir Samuel ...	77	3	15	1
Leinster ...	93	4	62	2
Lawlers	196	5	60	3
Wilson's Patch ...	97	5	72	3
Poison Creek ...	64	5	..	..
Lake Darlôt ...	34	1	...	...
Darda	92	6	7	1
Salt Soak ...	71	6	31	3
Erlistoun ...	54	4	16	2
Mulga Queen ...	83	6	12	2
NORTH COOLGARDIE GOLDFIELDS:				
Laverton ...	31	5	28	1
Mt. Morgans ...	37	5	56	3
Murrin Murrin ...	47	5	41	2
Mt. Malcolm ...	62	4	26	2
Mt. Leonora ...	48	2	46	3
Tampa	77	2	...	...
Kookynie ...	98	8	43	3
Niagara	156	8	43	3
Yerilla	142	6	...	...
Yundamindera ..	45	4	61	2
Mt. Celia ...	84	1	105	4
Quandinnie ...	107	7	...	...
Menzies	200	6	81	6
Mulline	224	8	81	7
Mulwarrie ...	248	6	57	7
Goongarrie ...	175	7	45	5
COOLGARDIE GOLDFIELDS:				
Waverley ...	193	4	37	2
Bardoc	226	6	44	3
Broad Arrow ...	218	9	49	5
Kanowna ...	126	8	55	5
Kurnalpi ...	161	8	55	4
Bulong	111	8	32	4
Kalgoorlie ...	138	8	53	6
Coolgardie ...	107	11	56	8
Burbanks ...	78	6	21	3
Bulla Bulling ...	91	4	...	...
Woolubar ...	80	2	..	...
Waterdale ...	112	7	40	5
Widgiemooltha ...	152	12	67	7
15-Mile Condenser	119	5	43	2
50-Mile	...	...	...	4
Norseman ...	154	10	55	6
Lake View ...	93	8	...	...
Frazer Range ...	...	...	...	...
Southern Hills ...	120	5	...	...
YILGARN GOLDFIELDS:				
129-Mile	...	...	...	...
Emu Rocks ...	...	...	240	4
56-Mile	222	...	123	...
Glenelg Rocks ...	...	..	241	4
Burracoppin ...	318	8	130	6
Bodallin ...	238	6	37	2
Parker's Road ...	289	11	...	...
Southern Cross ...	339	9	79	8
Parker's Range ...	289	11	154	11
Yellowdine ...	319	6	64	3
Karalee	220	5	68	4
Koorarawalyee ..	597	16	109	9
Boorabbin ...	267	9	99	11
Boondi	...	...	...	...
SOUTH-WEST (NORTHERN DIVISION):				
Murchison House	658	14	...	...
Mt. View ...	442	9	129	9
Mumby	521	13	279	17
Willow Gully ...	687	18	218	16
Northampton ...	596	14	295	10
Chapman Experimental Farm	539	14	289	12
Narratarra ...	...	...	...	...

RAINFALL—*continued.*

Stations.	July, 1907.		August, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
South-West (Northern Division)—*contd.*				
Oakabella	591	19	...	...
White Peak	613	16	...	...
Geraldton	808	17	197	14
Hinton Farm	796	15	...	...
Tibradden	...	..	...	...
Myaree	764	18	306	16
Sand Springs	871	11	236	4
Nangetty	...	...	170	11
Greenough	663	14	...	...
Bokara	579	19	226	16
Dongara	961	18	239	14
Strawberry	587	18	407	17
Yaragadee	417	14	203	9
Urella	491	14	143	9
Opawa	457	16	197	14
Manara	545	16	198	9
Mingenew	520	13	263	10
Yandenooka	605	16	218	11
Arrino	576	16	265	10
Three Springs	634	19	260	16
Carnamah	615	14	209	12
Hill River	873	22	421	14
Jun Jun	375	9	228	8
Watheroo	524	18	253	13
Nergaminon	688	15	...	...
Dandaragan	590	16	386	15
Yatheroo	616	18	502	18
Moora	708	16	347	16
Walebing	540	19	362	18
Round Hill	600	15	332	13
New Norcia	426	18	352	17
Wongon Hills	505	17	...	...
Wannamel	658	16	423	14
Gingin	751	17	554	14
South-West (Metropolitan):				
Wanneroo	993	18	601	21
Belvoir	996	19	781	25
Wandu	1028	23	789	23
Mundaring	1259	19	1042	23
Canning Waterworks	1125	22	852	22
Kalbyamba	997	20	...	...
Guildford	1012	21	644	21
Perth Gardens	1012	21	567	23
Perth Observatory	1068	21	559	25
Highgate Hill	993	21	554	23
Subiaco	966	23	525	26
South-West (Metropolitan)—*cont.*				
Fremantle	1322	22	401	23
Rottnest	701	24	313	22
Rockingham	1245	21	546	23
Jandakot	1254	20	773	21
Armadale	...	...	579	21
Jarrahdale	1641	19	1060	21
Jarrahdale (The Chestnuts)	1523	17	974	24
Serpentine	1208	22	770	25
Extreme South-West:				
Mandurah	1421	21	672	21
Pinjarra (Blythewood)	884	20	727	22
Pinjarra	1196	16	1101	17
Upper Murray	1178	20	1049	23
Yarloop	970	22	850	21
Harvey	929	22	763	22
Harvey Downs	...	...	...	...
Brunswick	1170	17	784	18
Collie	832	22	723	23
Glen Mervyn	1061	20	1003	21
Donnybrook	1029	25	694	23
Boyanup	1115	18	944	27
Bunbury	842	15	542	23
Elgin	1038	25	598	24
Busselton	1168	26	625	23
Quindalup	1374	24	771	24
Cape Naturaliste	1203	28	456	25
Glen Lossie	1272	29	580	26
Karridale	1488	27	605	25
Cape Leeuwin	1215	30	540	26
Lower Blackwood	867	25	813	24
Ferndale	759	17	907	24
Greenbushes	818	18	951	21
Cooeearup	...	...	774	25
Bridgetown	671	21	694	24
Hilton	549	12	653	18
Greenfields	704	17	567	20
Dunninup	625	9	..	...
Cundinup	412	12	...	...
Wilgarrup	744	21	754	22
Balbarrup	859	17	809	17
Bidellia	1166	21	846	17
Westbourne	596	19	521	22
Deeside	729	22	708	19
Riverside	735	28	720	20
Mordalup	488	18	...	...
Lake Muir	738	18	687	23

RAINFALL—*continued.*

STATIONS.	JULY, 1907.		AUGUST, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN AGRICULTURAL DISTRICTS:				
Walgo	367	11	351	14
Dowerin ...	345	12	198	9
Uberin	628	13	277	2
Cow-cowing ...	522	8	61	4
Ejanding ..	...	...	196	7
Hatherley ...	346	14	240	14
Momberkine ...	447	12	250	10
Eumalga ...	690	18	340	16
Newcastle ...	704	18	260	13
Craiglands ...	869	16	655	16
Eadine	590	18	423	19
Chidlow's Well	1000	21	944	23
Baker's Hill ..	637	18	501	16
Berry Brow	606	19	422	20
Northam ...	561	18	308	18
Grass Valley ...	519	9	261	13
Cobham	598	20	459	21
York	500	17	292	20
Burrayocking ..	495	14	302	13
Meckering ..	395	10	191	8
Cunderdin ...	419	13	222	13
Doongin	311	13	196	13
Whitehaven ...	331	11	277	14
Mt. Caroline ..	355	11	173	8
Quailing .	343	14	159	14
Cutenning ...	281	14	140	8
Kellerberrin ...	282	15	210	12
Cardonia ...	289	10	...	...
Baandee ...	280	9	139	5
Nangeenan ...	291	9	141	8
Merredin ..	293	9	142	7
Walgormouring	454	12	160	8
Codg-Codgen ...	340	15	197	12
Mangowine .	378	10	...	...
Yarragin ...	413	7	...	...
Koomberkyne ...	496	17	223	17
GREAT SOUTHERN RAILWAY LINE:				
Dalebridge ...	435	18	330	18
Beverley ...	508	17	294	14
Brookton ...	412	11	236	16
Sunning Hill ...	497	20	358	21
Pingelly	475	17	326	17
Yornaning ...	588	18	387	19
Narrogin ...	670	15	397	15
Narrogin State Farm	558	17	443	17
Rose Hill ...	396	16	314	12
Wagin	501	18	302	16

STATIONS.	JULY, 1907.		AUGUST, 1907.	
	No. of points. 100 = 1in.	No of wet days.	No. of points. 100 = 1in.	No. of wet days.
GREAT SOUTHERN RAILWAY LINE—*contd.*				
Katanning ...	446	20	286	19
Sunnyside ...	322	15	317	22
Broomehill ...	324	16	322	15
Woodyarrup ...	333	13	287	16
Pallinup ...	316	11	...	...
Tambellup ...	385	15	296	20
Toolbrunup ...	345	17	323	16
Cranbrook ...	449	20	281	18
Stirling View ...	460	17	361	17
Kendenup ...	622	23	620	19
Woogenellup ...	428	16	418	17
St. Werburgh's...	475	24	427	23
Mt. Barker ...	589	24	484	22
WEST OF GREAT SOUTHERN RAILWAY LINE:				
Talbot House ..	472	17	..	...
Jelcobine ...	597	16	364	21
Bannister ...	738	.	.	...
Wandering ...	662	20	509	21
Glen Ern ...	628	18	398	22
Marradong ...	634	19	614	16
Wonnaminta ...	599	20	471	22
Williams ...	614	14	360	13
Rifle Downs ...	...	...	...	...
Arthur River ...	523	16	361	14
Gainsborough ...	371	17	263	10
Glenorchy ...	675	12	482	15
Kojonup ...	721	15	507	10
Northumberland Homestead	613	22	419	22
Blackwattle ...	556	17	613	12
Warriup ...	486	18	468	23
Forest Hill ...	681	23	588	25
EAST OF GREAT SOUTHERN RAILWAY LINE:				
Sunset Hills ...	339	13	...	...
Oakdale	499	19	280	15
Barrington ...	390	14	...	...
Bally Bally ...	441	18	290	19
Stock Hill ...	435	15	269	11
Qualin	380	14	239	11
Woodgreen ...	271	11	162	16
Peakaring ...	379	13	298	12
Glenallan ...	468	17	304	17
Gillimanning ...	410	15	...	...

RAINFALL—*continued.*

Stations.	July, 1907.		August, 1907.		Stations.	July, 1907.		August, 1907.	
	No. of Points 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.		No. of Points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
East of Great Southern Railway Line—*contd.*					South Coast—*contd.*				
Wickepin ...	415	15	314	17	Peppermint Grove	245	18	243	16
Crooked Pool ...	501	15	233	13	Bremer Bay ...	276	14	254	13
Nallyring ...	447	18	376	21	Coconarup ...	84	7	101	10
Yardup ..	255	16	257	16	Ravensthorpe ...	97	11	80	9
Bunking ...	415	12	276	10	Cowjanup ...	...	...	...	...
Bullock Hills ...	454	13	240	17	Hopetoun ...	181	9	197	9
Dyliabing ...	405	13	...	...	Fanny's Cove ...	174	7	311	9
Glencove ...	432	20	352	19	Park Farm ...	151	12	343	14
Cherillalup ...	415	14	226	15	Grass Patch ...	105	6	...	...
Strathavon ...	280	17	237	18	Swan Lagoon ...	102	10	140	8
Warperup ...	314	15	291	19	30-Mile	138	11	215	10
Woolganup ...	268	12	214	10	Gibson's Soak ...	180	13	314	12
Chillinup ...		...	. .	...	Myrup	185	14	352	13
Jarramongup ...	283	10	...	...	Esperance ...	309	23	505	14
					Boyatup	...	...	...	...
South Coast:					Lynburn ...	166	12	...	...
Wilson's Inlet ...	684	22	607	20	Point Malcolm ...	...	...	..	...
Grasmere ...	695	23	831	21	Cape Arid ...	362	17	...	...
King River ...	492	16	624	17	Israelite Bay ...	79	15	...	...
Albany	662	23	623	22	Nannambinia ...	...	...	...	...
Point King ...	722	19	...	...	Balbinia	111	8	...	...
Breaksea ..	475	24	619	22	Balladonia ...	111	12	66	8
Cape Riche ...	238	14	...	...	Eyre	78	6	84	8
					Mundrabella ...	...	...	...	...
					Eucla	37	7	84	8

The Observatory, Perth,
10th September, 1907.

W. E. COOKE,
Government Astronomer.

By Authority: Fred. Wm. Simpson, Government Printer, Perth

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NOTES.

A Canadian statistician, quoting the import of wheat into Great Britain, gives the order of importance as United States, Russia, Argentine, India, and Canada. Australasia is omitted entirely, although her wheat exports to Great Britain surpass both India and Canada.

Searing Lambs' Tails.—The process of searing lambs' tails is becoming more popular every year. It has been claimed that lambs thrive better after having their tails seared than they did when they were cut. The searing does not attract flies as there is little or no blood ; again, a scab is at once formed and healing commences as soon as the operation is over.

Railage on Grass Seeds and Plants.—A communication has been received by the Under Secretary for Agriculture from the Commissioner for Railways to the effect "That the new grain rates to be brought into operation shortly will include grass seeds and plants, and will give a considerable reduction in the rates on these goods. A similar reduction will be made on fertilisers and agricultural lime."

Poultry Notes.—In the last issue of the *Journal* it was stated that sittings of eggs could be obtained from Narrogin farm for 2s. 6d. This on the face of it was a mistake, and it should have been 12s. 6d. per dozen. Two other mistakes occurred in the same article, namely, in line 23, page 672, "squal" is printed when it should have been "squab," and in line 17, page 673, "pitching eggs" should read "pickled eggs."

Distribution of Parasites.—In a report of the Assistant Entomologist for August, Mr. Newman states that he has distributed 10 colonies of cabbage aphis parasite, 4 colonies of Red scale parasite, and 1 colony of Soft Brown scale parasite. The ladybirds (*Leis conformis*), and the twice-stabbed ladybird from Southern Europe, are showing very plentifully this spring. Colonies will be collected and sent out as required. The parasite of the *Lecanium cymbiforme,* imported from California last April, has been carried through the winter successfully; this insect is also a parasite on the *Lecanium hesperidum.*

Potato Experiments.—A correspondent writing from Northampton states that he has just dug a small patch of potatoes of the "Northern Star" variety, obtaining a yield of 39lbs. from 3lbs. of seed. This potato, which is an introduction of recent years, caused some sensation when first introduced, a single tuber fetching £150. It has been tried in various parts in the South-Western Districts of this State with indifferent results. After the second or third trial it has generally been discarded. It is evident, however, that it has done much better in the Northampton District, and we shall be glad to hear the results of any future crops.

Export of Lamb.—It may now be said that the industry of raising lambs for export has commenced in earnest. A ceremony took place last month at the works of the Western Fresh Food and Ice Co., situated at Fremantle, when an official inspection was made of between five thousand and six thousand frozen lambs ready for export. Space was available for eight thousand five hundred carcases, while an upper room could be availed of which would hold another twenty-five thousand. The manager of the works during the course of his remarks, said he hoped farmers would take the matter up and utilise the whole of the space available.

Deep Silos Preferable.—A deep silo is preferable to a shallow one, because more ensilage can be stored in the same number of cubic feet ; the pressure being greater, the contents pack more closely. The extra weight of ensilage in a deep silo more thoroughly excludes the air, and for this reason the silage keeps better. If built high instead of wide, more ensilage will be removed from the surface daily, which will guard against spoiled feed. The deep silo requires less foundation wall, less cement floor space, and less roof, which in some localities and with certain kinds of silos is an advantage. Less help is required in spreading silage in a deep pit. The spoiled silage at the top is less in proportion to the whole amount.

Successful Boring.—About twelve months ago, in response to representations made by Mr. J. M. Drew, M.L.C., the Minister for Mines personally exerted himself to secure the loan of a water bore to Messrs. Lymburner and Baker, selectors on the Mt. Erin Estate. Mr. Lymburner has now written to Mr. Drew as follows :—"We have now done with the bore and so has everyone else in the vicinity. By having the use of it, we found water on the sand plain where the old identities scorned to look for it, so it has given new life to this part, as we are on the extreme east of the good country on Mt. Erin, and right in the sand-plain. We (that is Baker and self) are, so to speak, pioneers in the water line, and stood to lose a lot if we found no water." Mr. Drew has written to Mr. Gregory cordially acknowledging the valuable help the Minister has rendered to the agricultural industry in the Mt. Erin district.

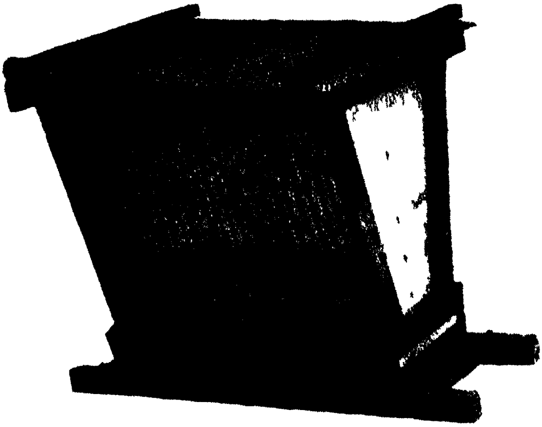
New Bulletins.—The following new Bulletins are now ready for distribution, and may be had on application to the Department, or will be posted on receipt of a penny stamp. "No. 24, Stack Silos"—This treats on the most inexpensive way in which to make ensilage for summer feeding. "No. 25, New Sun-dial, or Helio-Chronometer," giving drawing and particulars so that any handy man is enabled to make a sundial that will give the correct time to within two minutes. "No. 26." This contains a reprint of the proceedings of the Producer's Conference, held in Perth recently, together with a full report of the discussion that took place on the formation of the affiliation of all Agricultural Societies in this State. As a reference and record of this is most important, every farmer should make a point of obtaining a copy. "No. 27" is devoted to Vegetable Growing. Market gardeners and settlers generally will find a lot of useful information in this pamphlet.

A dairyman, who believes in the ensilage-pit, writes thus to the *Leader*:—"We advocate the silo because, in our experience, we have found—1. That we can never harvest a maize crop and get so much out of it at as little cost. Considering the ears alone, we never get as much milk out of them at as little cost as we do when put in the silo. 2. We never get as much out of the stalk as we do when it is cut just as the ear is glazing, and the whole, ear and all, put in the silo. 3. Cut at the glazing stage the stalk represents 40 per cent. of the combined value of both stalk and ear. Put it into the silo and you preserve that freshness and succulence all the winter. 4. It is a curious fact, but true, nevertheless, that the strongest opponents of the silo are the men who never tried it. Very rarely do we find a man who owns a silo who lets it get into disuse. The strongest advocates of it are the men who own one, who have fed it, and noted its effects on the cow. If the universal testimony of those who have silos is in favour of it, what more can be said?"

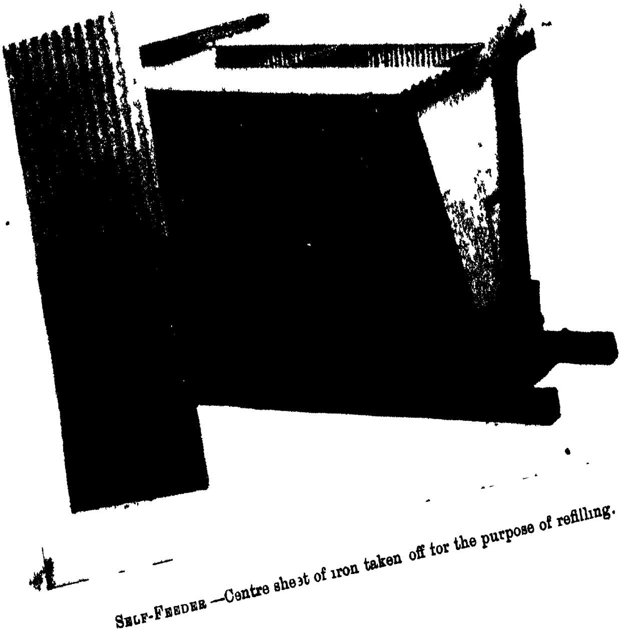
Teaching a Calf to Drink.—Some difficulty is occasionally experienced in teaching a calf to drink, and the following American method may be of interest, though probably not quite convincing:—Fix things so the calf can never suck its dam, and when the cow has mothered it for a few hours, milk about three quarts of her milk into a pail, put it up under the calf's nose so as to touch it, and in a minute it will drink from the word "Go," and you have won out, and kept your piety besides. A calf that has never sucked will drink as readily as it will get the hang of finding its own dinner. By the same rule, a heifer should always be hand-milked, and then she knows no other way. Let the calf run with her a few days, and then to milk her is, in her way of thinking "robbery" of her calf, and you have to break her, which often is quite a vaudeville show, and often of somewhat unpleasant memory. From the start, play that you are the heifer's calf, and make her believe it, and to the calf be its god of the feed dish, and two disagreeable things in dairying—breaking heifers and teaching calves to drink—are made into pleasant pastimes.

An Australian farmer gives the following advice in the *Leader* with regard to eradicating wild oats:—"Just as soon as the crop is cut, and before the surface gets sun-baked, stir deeply with the scarifier, and at intervals again scarify till the ground is stirred to a depth of about three inches, so as to give the wild oats a chance to germinate, and when sufficient growth has taken place, feed off with stock. Repeat the operation, and the surface to a depth of three inches will be clear of wild oats, but underneath that depth they will be the same as when last ploughed down, and they will retain their vitality for any number of years till again brought to the surface. Therefore, after the surface has been eaten off, plough the land the depth it has been formerly ploughed, thus bringing up all the buried wild oats to the surface. Then with occasional scarifying and seasonable rains those oats that were buried, but now brought to light and encouraged to grow, can be fed off, and the land, if not perfectly clean, will be safe to crop with wheat for several years. The reason many fail to eradicate the pests is that they spell the land, feed off all wild oats, get the surface perfectly clean, but neglect to plough up the oats that are four or six inches under the surface. They are under the impression that they will rot or die, but this impression is an erroneous one."

Cabbage Aphis.—Mr. Newman, the Assistant Entomologist, reports that cabbage aphis is very scarce in the Perth districts, and is hard to find. This is put down to the fact that the parasites introduced have done much good work. In the August issue we published a letter from Mr. Maywood, of Fremantle, in which he states that his garden had been completely cleared of aphis by the introduction of the parasite, and the following paragraph is taken from the *Kalgoorlie Miner* of the 8th inst.:—A local amateur gardener, whose information may be relied upon, writes as follows:—"A few weeks ago I wrote to the Department of Agriculture asking about the aphis parasite, which I was told could be obtained there. I received an answer on September 20 enclosing the insects in a glass tube covered by a cardboard box. A minute fly on arrival, but in less than a week they were full-grown and increasing rapidly. I liberated the valuable little creatures in one of my rose-bushes. Roses, stock, sunflowers, pansies, etc., were covered with aphis vermin, and were suffering severely. In less than a week the aphides were completely cleared, and the parasites then passed off to my neighbours with the same result. I have sounded my neighbours, by the way, as to paying me a royalty, but they do not appear to take my suggestion with any great enthusiasm. The full-grown parasite is slightly longer and a little thinner than an ordinary house fly, brown, with a few spots on wings and hind legs. She is very active, and sets about her work in a business way. I understand that her main work is to clear cabbages. She should affect quite a revolution in gardening on the fields. They seem to have come to stay, for the adjacent gardens are now swarming with them. The Agricultural Department has conferred a boon on the owners of gardens."



SELF-FEEDER.—See letterpress page 733



SELF-FEEDER.—Centre sheet of iron taken off for the purpose of refilling.

SELF-FEEDER FOR STOCK.

The illustration of a self-feeder, given in this issue, represents the type selected from several others after a number of trials. It is one that strongly recommends itself to farmers.

It is constructed of ordinary corrugated galvanised iron with a hardwood frame, and is lighter than most feeders in use. It is therefore easier to move from place to place.

The skids upon which it is built have at one end a hook to which the whipple-tree is fastened, and when empty a horse can drag it to the position it is intended to have it.

The feeder is made V-shape in order to facilitate the settling down of the chaff when filled. The filling is done from the top, which consists of three sheets of iron, each 2 feet wide, the centre one being loose but kept in position by two cross pieces of wood, working on a pivot and closed with a clamp, as shown in the illustration.

A board, six inches wide, is placed on its edge along the centre of the bottom, inside. This device prevents the chaff from blowing out of the opposite side to that facing any strong wind that might blow ; it also directs the feed into the troughs at each side.

The roof is made sloping from end to end, in order to carry off all water and thus prevent it from dripping into the feed or on to the stock whilst feeding.

The frame-work is bolted together, no mortising being required ; the construction is simple and the cost moderate.

DAIRY CATTLE.

By J. L. Burns, V.S., Acting Chief Inspector of Stock.

Notes for Farmers.

The following are a few words of advice intended for those who are out of reach of professional assistance and who are often unable through want of knowledge to help themselves, on some of the more common ailments of dairy cattle likely to be met with in every day practice.

Perhaps it will hardly be necessary to say that proper protection from bad weather and proper food and water of sufficient quantity are things absolutely essential if these animals are to be kept in health and condition.

In a climate such as this, where animals live more or less in a natural state for the greater part of the year, they seldom suffer from disease or from complaints of a serious nature, and physic is not often required. Indeed, unless the action of drugs on the animal economy is thoroughly understood such things had far better be left alone altogether, and the administering of medicines by way of experiment, which is a bad habit contracted by people who cannot be happy unless they are pouring poisonous concoctions down the throats of unfortunate animals (usually belonging to somebody else), often does more harm than good. Owing to this propensity far more animals are doctored to death every year than would die naturally if left entirely to themselves.

Calving.

This being a natural process is in the majority of cases got over without much difficulty, and when assistance is necessary care must be exercised that the cow is not injured by rough treatment. These cases require coolness on the part of the operator and a good practical knowledge of the work. After calving, the placenta or after-birth, commonly known as the "cleanings," should be removed by gentle traction and slightly twisting at the same time. It is then desirable to wash out the womb with some disinfectant such as permanganate of potash and water, or a solution of phenyle and water. If neither are at hand, common salt and water may be used instead. If the bowels are not acting give as a drench ½lb. of Epsom salts with ½oz. of ginger in a quart of warm water. A few handfuls of oaten meal with a little salt in half a bucket of warm water may be given to an animal that will not eat, and this often helps by supporting the strength until the animal is again able to digest the usual food. A useful tonic in such cases is ½oz. each of iron carbonate, common salt, and ground gentian root given night and morning for a week.

Mammitis.

This is an inflamed condition of the udder characterised by heat, swelling, and tenderness of the parts, and needs prompt treatment. Keep the milk drawn off and apply hot fomentations kept up for some hours. A liniment composed of camphor and belladonna with a little sweet oil, well rubbed in, often does much good, followed by gentle manipulation.

Sore teats require washing with some simple application such as Condy's fluid and afterwards dressed with boracic acid until well.

In the case of more serious affections so much depends upon the particular symptoms at the time that it is not possible or desirable to give here any definite line of treatment.

A letter addressed to the Stock Department on such matters will receive immediate attention.

I would suggest that a very useful little instrument for every farmer to have on hand is a clinical thermometer. One lesson on the principle of its construction and use would be sufficient in order to understand its value in the treatment of disease and other affections in animals.

On account of a most lamentable exhibition of ignorance by a man in the police court lately calling himself a veterinary surgeon, and who said that the normal temperature of the horse was 56 degrees and that he could not live when it went up to 120 degrees, or something equally laughable, it may be as well to state for the general information of such gentlemen that the temperature of the horse in health, that is the normal temperature, is about 101 degrees F. In cattle it is about the same ; in sheep about 104 degrees ; in the pig 102 degrees ; in the dog 100 degrees ; in the cat 101 degrees ; fowl, 107 degrees ; duck, 109 degrees ; goose, 107 degrees ; turkey, 109 degrees. These values may be taken as approximately correct and they do not vary much in health.

SAN JOSE AND MUSSEL SCALES.

By T. Hooper, Chief Inspector of Orchards.

I beg to report the completion of this winter's inspection of the San José scale infected orchards. Nineteen fresh orchards are reported with 213 trees infected. Notwithstanding these, the returns show a substantial decrease in the amount of this scale in this State. Including the fresh cases mentioned we have 4,382 trees at present infested as against 5,791 last year, a decrease of 1,409 trees. The above 19 fresh cases brings the numbers of orchards known to have had this scale to 353 as against 334 last year; of these, up to last year 178 orchards had been cleaned of this scale, this year 11 more orchards have been reported cleaned, bringing the total of cleaned orchards up to 189, thus leaving 164 still diseased.

I consider that after a previously infested orchard has been reported clean for three years in succession, it is quite certain to remain so for all time unless it is infested from some other orchard, and 161 orchards have now passed this test. If we can only approximate this rate of reduction each year, the San José scale will in a few years be a pest of the past so far as this State is concerned.

Lime, sulphur, and salt has been the wash principally used to bring about this good result, but it will not do so unless thoroughly applied to every inch of the tree, as any little spot missed may contain the scale; also, it is very necessary it should be applied in dry weather, and I am therefore afraid the excessively wet winter may have somewhat retarded our progress and injuriously affect our returns next year.

In addition to the above wash, many orchardists this winter have tried a new one, viz., "Aphistine." Last year it was satisfactory where properly applied, and this year will give us further knowledge as to its safety in regard to the trees and its effectiveness in eradicating this scale.

Mussel Scale on Apple and Pear Trees.—Last year there were two orchards returned as cleaned and 12 infested, total 14, with a total of 251 infested trees. This year six orchards are returned as cleaned and nine infested, total 15, with a total of 240 trees. It will, therefore, be seen that the infested orchards have been reduced by three, and the number of infested trees by 11. This is on the right side, but I had hoped for little better returns and trust next year to get a bigger reduction in this scale.

I have every reason to be satisfied with the efforts of the inspectors and growers which have brought about the above results, as only those well acquainted with insect life in its many different forms realise what an amount of care is required to successfully cope with them.

MARKETING OF CROPS.

A meeting of producers, produce merchants, millers, and auctioneers was held under the auspices of the Northam Agricultural Society in the Northam Mechanics' Institute, Saturday, 21st September, 1907. Mr. T. H. Wilding, the President of the Society occupied the chair.

The Chairman, in opening the proceedings, said :—I think it is needless for me to make any remarks as to why this meeting has been called. The large gathering here speaks for itself, and shows that it is well known throughout the State that a meeting was to be held here to-day to discuss the matter of marketing our crops: This meeting has been called by the Northam Agricultural Society, as the members felt it was necessary to do something in this direction, as they feel that their produce is being placed on the market in many instances in such a way that they are not getting full value for it. We will hear both sides of the question to-day, and I hope much good will result. I am also hoping that the speeches will not be too long, otherwise we may not be able to get through. I will now ask the Minister for Agriculture to address you.

The Hon. Minister for Agriculture (Mr. Jas. Mitchell, M.L.A.), said :—May I say I am delighted to see so large and representative a gathering here to-day? When I suggested you should call a meeting, I had no idea that the suggestion would be taken up so seriously by the people of the State. Practically the whole of the people of Western Australia have taken an interest in it, and to-day we have representatives from all parts of the district to discuss this question of marketing our crops. We realised it was necessary to do something to bring about a better state of affairs. Producers generally have been dissatisfied with the prices obtained, and that dissatisfaction is the result largely of comparison of the prices here with those obtaining in the East. Of course in this transition stage there must be some difficulties, and a time when prices will be against us: But we believe we are getting past the time when we produced only enough for ourselves. We shall have in the new season a surplus of 2,000,000 bushels of wheat for export, and the position now is so serious that it must be faced. The members of the Northam Agricultural Society have always been to the fore in all matters making for the good of Western Australia, and it is not surprising to find them taking up the position they have to-day. Not only have we reached a time when we export wheat, but we are exporting lambs and apples also. Our wheat and our lambs must face London now, and what we want is to face London under the best possible conditions. (Applause.) Difficulties will have to be faced and fought, and we believe the producers should combine with that purpose in view. It is a great advantage for the producer to arrive at a time when he does face the unlimited market of the world for we can now get London values for all our stuff, and cash for it, too. For when you put your produce on board a ship it means cash for the producer; and every man who knows anything about the land will agree with me that the farmer should get cash for his produce when he is ready to sell, and not when the market is ready to absorb it. That was all right for the time of the past when speculators could come in and operate in the narrow home market; now, however, we have to face the markets of the world, and we have asked you to come here and discuss with us to-day the question of marketing the crops. Wheat to-day is quoted in Melbourne at from 4s. 1½d. to 4s. 2d., whereas in Perth it is quoted at 3s. 7d. My friends the merchants are smiling, and will say there is not much wheat to sell to-day; but there was a considerable difference all last season between the Melbourne value and the value the farmer in this State got for his crop. We don't get the Melbourne values for our produce. I realise that that was inevitable when we had so little to ship that the freight and charges were against us ; but having as we have to-day 2,000,000 bushels to ship, the freight and charges will be something like equal to the freight from Melbourne. I believe the nominal freights from Melbourne are the same to-day as from Fremantle. I believe that is so. It is something near the same, but the actual freight from Melbourne is much cheaper than you can get from Fremantle. The Melbourne price is based upon the nominal freight and not upon the actual freight or the freight some of the more fortunate, it would appear, are able to get from time to time owing to some ship being available. The Melbourne prices are based upon the export value subject to this nominal freight charge. I don't want to say very much about hay, except that its price to-day is from 72s. 6d. to 77s. 6d. in Melbourne as against our Perth prices of from 40s. to 70s. I have just had a telegram from Melbourne, which says the price of chaff has jumped to £4 10s. I don't propose to discuss this chaff question. It is rather beyond me, but I believe there are in the meeting some of the members of the Northam Agricultural Society fully qualified to speak upon the subject. If we take the lamb values we find they are very much less in Western Australia than in the East. How is this to be explained ? I will be told probably that our lamb is inferior to the lamb of the Eastern States. All I can say is that I prefer the Western Australian lamb. (Applause.) I know that some of this frozen stuff which we get is not quite equal to the lambs we see in this district of ours. I would like to say that this year there ought to be from 10,000 to 20,000 lambs shipped, and it ought to be a rapidly increasing industry. It is of the utmost importance to the development of this State that the producer should get the fullest possible value for his products and especially necessary that he should get full value for his lambs. The lamb shipment of last year was most fortunate and the prices realised were in excess of local values. I see that 600 lambs are now being prepared for shipment at Fremantle. They are going away presently, and I hope they will reach London at a time when they will be absorbed at a high price. I am sure Western Australia can produce lambs equal to anything in any part of Australia. (Applause.) Further, I believe the business is going to expand very rapidly. Some of our friends are facing the question of export, and they tell me the charges connected with the work are very little above those ruling in the Eastern States—that the freezing, shipping and selling charges are much the same in Victoria. So long as the prices we have to pay for these services are about equal to the prices in the East, I think we will be quite satisfied. In this transition stage, we might have to pay a bit more. However, the time of short supplies is fast passing and in the near future we shall be dealing with large numbers. To go back to the shipments of wheat from Mebourne. Apparently the charges are something approaching 10d. The Melbourne price to-day approximates 4s. 2d., and the London price is about 5s. That leaves 10d. for the cost of shipment and handling. I daresay some gentleman present will tell you what the shipping charges from this State will be.

I am quite sure it will be interesting to know what we will have to face this year. In regard to railway freights for export, I would like to remind you that the Government last year reduced the freights by more than 25 per cent. And I would like to make this point—your charges to the port have a very important bearing on the values realised for the whole of your crop ; because it follows that if wheat is worth 4s. in Fremantle for export with a freight of, say, 2d. from Northam it is worth 3s. 10d. to the local miller. If the freight be 3d. the local miller will be paying 3s. 9d. for the wheat. I mean he will pay just the values for export and deduct the charges to the port. I make this point, because I want you to realise how necessary it is that freight on wheat for export should be as low as possible. This is necessary, not only to enable us to compete with the freights in the East, but also in its bearing upon the price of the total crop, which has yet to be proved. I want the producers and the people here to-day to realise that the freight for export is not only an advantage to the wheat exported, but an advantage also to every bushel of wheat you produce, for it fixes the value in the district for the wheat sold to the local miller. (Applause.) There is one point I omitted to mention in connection with the lamb question—it is just 19 years since they first started to exports lambs from Australia, and the volume of trade to-day is 3,458,000 lambs and 2,260,000 carcases of mutton. With regard to the attitude the Government intend to take up, we are endeavouring to settle the people on the land ; we are spending a great deal of money to that end, and, I believe, we are doing it successfully. (Applause.) That being so, it is surely the clear duty of the Government to see that the settlers get the best possible prices for their produce—and that is the London value, minus charges. We have already reduced the railway freight by 25 per cent. and, I believe, subject to conditions as to quantity, there will be a further reduction this year. (Applause.) But it would be futile to do anything in this direction unless the farmers at this stage of the year, before the crops ripen and are ready to strip, take advantage of the reduced rates. The farmer wants to realise that he can ship at this price and that the price he can get to-day will probably be benefited by a reduction of freights which I hope will be made in the course of a few days. But apart from this, we propose to assist the farmer to get the full value of his wheat this year—if he cannot do it by other means. I am arranging for sheds at Fremantle and Albany and for storage space at Geraldton. (Applause.) I require it in order that I might advance to the owner of the wheat stored if necessary. (Applause.) If the Government believes that the producers of wheat in this State are not getting full London values at our ports, then we will be prepared to store the wheat and advance against it. That ought to meet with the approval of the producers, but I believe that arrangements will be made by the merchants which will be quite satisfactory to you. Whilst I am perfectly in earnest in saying we are ready to take your wheat and advance against it, subject to quality, I want the merchants to realise that I believe in private enterprise—that I believe the producer has benefited by private enterprise. I don't think the State control of any industry will result in the same economical working that you can get by private enterprise ; but I want people to realise that I am quite ready and quite determined to do all I have said to-day I am willing to do. It may mean a considerable amount to the State this year. Because if you take our 4,000,000 bushel crop, an advance of 3d. will mean £50,000 to the producer, while an advance of 6d. would mean £100,000—no small sum. I don't know that there is very much more for me to say in this connection. You have a lot of people here and several resolutions that will take up considerable time, but I would like to impress upon you the necessity for facing this situation and for doing the best you can. To attain success the exporter must do the best he can for the producer, while on the other hand, the producer must do his best for the exporter. So long as I am in my present position I mean to do what I can to benefit the man on the soil. I don't want to hurt the middle man, because he is necessary. He represents the only economical way of distributing your products—notwithstanding much that has been said to the contrary. But in the interests of the producer we must be prepared to take the matter in hand just now—and we are prepared. When, last year, I discussed cool storage some of my friends protested very strongly. They did not want the Government to interfere. But they scarcely appreciated the situation, for the result has been that they have had their stores filled through the work of the Government. And there will be a great many more next year than there are to-day. I hope the work I have in hand now will result as pleasantly as did the work I had in hand when I discussed cool storage. I hope this meeting will result in all the good you expect of it, and that when these resolutions come along to me in Perth I shall be able to favourably consider them.

The Minister then withdrew.

Mr. O. L. Bernard (Mayor of Northam) said:—After the comprehensive speech made by Mr. Mitchell there is not much left for me to say. My thoughts have been running somewhat in the same groove as Mr. Mitchell's—which speaks very well for Mr. Mitchell. (Laughter.) The resolution I have to move is as follows:—"That the producers of the Northam district desire the Government to—

(1.) Materially reduce the freight on wheat for export.

(2.) Provide suitable storage accommodation at all railway stations in the agricultural districts, and free and ample storage at the shipping ports.

(3). That all facilities be provided at the shipping ports for the rapid and effectual handling of produce.

(4.) That all wheat consigned to such sheds be classified and weighed and warrants issued for them.

(5.) That if necessary the Government advance, say, 75 per cent. of the value of the goods represented by such warrants.

(6.) That, should it be found advisable, the Government be asked to arrange for the final marketing of the produce."

Mr. Bernard, proceeding, said:—We wish the Government to materially reduce the freight on wheat for export. For my own part I would make it on wheat generally, whether for export or otherwise. I see no reason why the miller should pay a bigger freight on his wheat than will the shipper. The Government can well reduce it by one-third and at the end of twelve months they will have a considerable increase of revenue. The Government is nothing but a common carrier contracting in the same way as E. W. Carter and Co. Bear in mind that not only will the quantity of produce to be handled be probably three or four times as much as in previous years, but the distances it has to be hauled will be greater. Some of it will be by wagon and some by rail. The average mileage per ton during the last couple of years under the system of every farmer selling to the miller would not run out to more than 15 miles ; probably less than that. Now, in all probability, under export conditions the average will be more like 100 miles. So the conditions are totally different, and I say the Government can well reduce the freight on wheat by 33⅓ per cent. The second clause of the resolution sounds socialistic, but it is purely a business proposition. As for the last clause of the resolution, if after all we have arranged about the storage and everything is there and we see there are not sufficient buyers, then there is no reason why the Government should not instruct Mr. Rason in London to hire a couple of ships and take the stuff away. The Government could send a sample to London and Mr. Rason could easily get a man to submit that sample. There is nothing startling about that. It represents the opinion of the majority of us here. We don't want to interfere with private enterprise, for the middleman is of great use to the farmer. He is part and parcel of the machinery necessary for the disposal of the crop. He is doing your work for you, and as long as he charges only a fair thing for his efforts he should be encouraged. To my mind it is preferable for the farmer to dispose of his wheat as soon as it reaches the nearest railway station. The Government should do all they can, but the producer likes to be left perfectly free. If the Government adopt these resolutions a bushel of wheat should become legal tender. It should become a marketable article —with a certain specified standard price—that is within 11d. or 1s. of the London price. Thus when the cables tell us that wheat is worth 5s. in London we can then say, "My wheat is worth 4s." It seems to me the Government should take some steps in connection with this movement. I am not in favour of molly-coddling any industry—and Northam farmers don't want any particular nursing—but this industry is in a state of transition—competition has not arrisen yet—it is not properly settled, and it seems to me that it would be quite right and proper for the Government as carriers to help the farmer for a year or two until things have settled down.

Mr. Henderson (Manager for Wills & Co.) said:—As representing one of the export houses I have no hesitation in saying that there is not the slightest necessity for the Government being asked to either advance against wheat on warrants as suggested, nor to arrange for the final marketing of the produce. (Applause.) This the producer has not found necessary in any other of the Australian States and I am safe in saying that in this particular State competition is often keener than in the Eastern States, and for that reason farmers will find they are getting full value for their wheat for export. (Loud laughter.) I will put one little fact before the meeting which they may not be aware of. After I have finished the few remarks I have to make I have some facts and figures and I shall be only too pleased to answer any questions farmers may care to put to me—if I can. Last year my firm were not in a position to buy wheat in Northam itself, for the reason that the Northam mill was giving full export value, taking into consideration the fact of the very much higher rates of railage and freight to London. The freights from Western Australia are nothing like as satisfactory as those from the East. We have a very much smaller number of sailing vessels come to this port and by the time steamers which call at Fremantle reach here they have very little space available ; therefore the rate of freight is very much higher. When we have a very much larger exportable surplus here tonnage will be more easily secured, but at present it is very hard to get. This question of grading by the Government—I don't know that that would be necessary or whether it would be workable. If they provide storage sheds for you you can't handle each individual farmer's wheat separately; you would want a shed to cover half Fremantle to do that. Therefore a warrant for 1,000 bags of wheat—say Wilson's wheat—for the Government to find Wilson's wheat would be clever indeed. (A Voice: F.A.Q. is all that is wanted.) Wheat when it comes into a stack is just wheat. If it is not fit for a shipment when it is received by the exporter it is rejected promptly. It is graded and marked straight away and not allowed to go into the export stack. As regards the question of marketing in London by Mr. Rason, Mr. Bernard said you would just cable Mr. Rason to charter a couple of ships and take the stuff away. Well, I can say that this trade is not learned in five minutes, and if you start off without knowledge you pay for your information. It requires very expert knowledge to handle wheat, as the Government will find if they try to handle it themselves. But I don't think this is necessary in this State. There is as much competition in this State for the farmers' business as there is in a place like Melbourne. Nearly all the Melbourne houses are represented here and the volume of business is very much less. And although there has been a considerable amount of dissatisfaction I don't think the farmers will find they are paying too much for their merchandise or are not getting reasonable value for their produce, taking all circumstances into consideration. Any line of merchandise you like is selling in Western Australia at a price slightly lower than in the other States and the cost of landing it is higher while the cost of selling it is very much heavier. In regard to produce you must not forget that last year you were handling in London a line which is practically unknown to them, and on the price at which the export buying commenced last year farmers were getting the full market value. Farmers must not be led away by the fact that during the course of the season wheat advanced by something like 10s. per quarter—hitherto unprecedented. It is all very well to say that we might have known, but as our London house advised us when I mentioned to them that they might have more correctly gauged the future of the market they said, "Had we foreseen this we would have been multi-millionaires and gone out of business to-morrow." Take the cargoes: our cargoes were sold for 30s. 10½d., 31s. 3d., and 32s. 6d. The present market price is from 39s. to 40s. Had we held for this price it would have meant a considerable number of thousands of pounds to us. Had we but known we would have held the cargoes up till now. If anybody could correctly gauge the market he could make his fortune in one season. The wheat dealers of Australia are not wheat gamblers at all: they are purely wheat dealers. Another difficulty in Western Australia as against the East is this: There a big operator can step into the freight market and can engage tonnage now for probably a dozen ships, knowing he will get the wheat. In Western Australia we have got to get the wheat and then engage the tonnage, which puts us on a very bad footing and for that reason we cannot realise perhaps as well as they can. With regard to the reports of the Melbourne market: At present it figures at 4s. 2d. This is the local market value of wheat sold in the open market for local consumption. You are probably safe in saying that the export value is approximately one penny per bushel less. For some considerable time past the Melbourne market has been twopence per bushel higher than Adelaide. Why that? It is from the fact that they are so situated that, having the subsidised line of steamers running to China, they are in a position to export their flour to this particular market, which is a good market. There are very many reasons, if you go into the question, why the market of one State will be better than the other. I say there will not be the slightest necessity this year for the Government to offer any assistance to the farmer for handling his produce. You give him just as low a railage as possible—and I consider the Railway Department doesn't want to make a profit : they want to pay interest and probably a small sinking fund, but nothing further. Then again, by all means have storage sheds at Fremantle. By that means the wheat can be handled more economically than it could if handled into private stores and sidings and wages paid. I know that Mr. Mitchell realises that we have got to look to our farmers for the future of this State, and while he remains in his Ministerial position I think we want to make the very most we can of him and get him to assist the farmers. In assisting the farmers he is assisting the merchants, for we also assist the farmer. You can take half-a-dozen of the big merchants in Perth who at the present time have well over six figures at stake with the farmers, and if you can demonstrate to me that it is not to their interest to see the farmer get top prices I will give in. The merchants are assisting you in every way. I think you will find that the merchants are just as keenly in competition for your produce as they are for your merchandise and machinery business—and I think by the way you are worried by their travellers in that line you will realise they are pretty keen on it. At the present time you are buying your fertiliser in Western Australia cheaper than are the farmers in South Australia. Yet the cost of landing in South Australia is slightly lower than it is here. We cannot get our stuff handled as cheaply in Western Australia as we can in South Australia and that is because the labour element is in the ascendancy here. Our wheat shipments cost us very much more here last year than in the East, in addition to which we had to fight to prevent the handling of wheat increasing by 25 per cent. Had they beaten us you would have had the price up abnormally for the next ten years : but through the assistance of the Government Labour Department—who supplied very unskilled labour—we were able to withstand them, as a consequence of which you will be able to get wheat handled the same as hitherto. Surely that in itself is something we ought to be thanked for.

Mr. Geo. Throssell, M.L.C., said:—I suppose there is hardly a producer present who will not in the main support the resolution now before the meeting. It asks for receiving sheds, low freights, facilities for shipment—there is nothing novel in all this. Every little farmer has been asking for the same thing in different language for years past. With regard to the proposal to ask the Government to advance 75 per cent. on the value of the wheat stored if it is required, I am very glad it is so qualified. If it is required and if there were no facilities and no firms and no possibility of getting cash it would be a very proper thing to hold this rod over the backs of the business men. Because, as Mr. Mitchell has said, it is of no use placing the people on the land unless we take care of their interests after they have produced. The question for you to consider now is—we will agree about the facilities and the low freights—the question is, is it necessary to go to the Government for the 75 per cent. advance ? I emphatically say it is not so necessary. The banks and every other institution of the kind are willing to take the wheat and give you the highest value. You have a representative sitting in the room now who has initiated for you a scheme to protect the farmers—I allude to Mr. Chas. Harper, who has formed for you a Farmers' Union, who has initiated shipments of fruit, wheat, and lambs. The Union has gone further—and I am no special advocate for it—for dotted along the countryside you will find large and comfortable sheds marked in large letters, "The Farmers' Union"—receiving sheds showing that we have already these facilities. So while I am in favour of the resolution you will, I am sure, remember that there is not the slightest necessity to go the Government for an advance. There is not a firm in this town but would be willing to advance upon the warrants suggested by Mr. Bernard. I have pleasure in congratulating Mr. Bernard on having brought forward this resolution. I have explained that I am in accord with it entirely because you yourselves have been asking for all that is here with the exception of the 75 per cent. advance. If there are no institutions here that will make the advance then by all means appeal to the Government. In supporting private enterprise I would point out to you that we must guard against this—that if we have private enterprise willing to make advances we must take care that the conditions will compare favourably with what the Government can do for us. That is the point. If private enterprise attempts to overcharge us then we must hark back to the Government. And happy are we in having a Government who will assist us. (Applause.) I shall be very glad if Mr. Harper, before the debate closes, will give us an expression of his views on the broad question.

Mr. C. R. Knight (local representative of Wills and Co.) said:—Last year I was instructed by my firm to buy or to advance 75 per cent. of the market value. The result of that was that almost the whole of the wheat we sent away was purchased straight out. The farmers preferred to sell to us rather than to ship it. Only with respect to two parcels from this district did the farmers elect to send the wheat to London through us for which we advanced up to 75 per cent. I mention this to show that the local farmers can already get that advance. They can get full London prices less charges. I think with regard to the question of the Government making advances against wheat there is no harm in the resolution : at the same time there is no necessity for it. On the question of whether it is desirable to foster private enterprise or whether the Government should take up too many private enterprises it would, to my mind, be a great mistake if the State entered into too many private enterprises, because it would at once kill private enterprise and would eventuate to the disadvantage of the producer. There is no necessity for that portion of the resolution, for each firm such as Wills, Dalgety's, Guthries, and others are prepared at any moment to advance the farmer 75 per cent. on his wheat, or to buy it.

Mr. Henderson said:—I would like to say that when the London market opened last year the value was 29s. 6d. per quarter. The market price here was 2s. 8d. Threepence a bushel puts it down to Fremantle. That is 2s. 11d., or 23s. 4d. Freight and charges amount to 7s. 4d., or 30s. 8d. in all, which is approximately the price Wills and Co. paid on a 29s. 6d. market. These figures have been in the hands of the Western Australian Government and can be verified at any time. It was to a very large extent with the assistance of Mr. Chas. Harper that these rates on wheat were reduced, and with that end in view these figures were put into the Railway Department and are at present on the files of the Commissioner of Railways. As I have said, we sold at an average of about 31s. Certainly we made a profit greater than we had anticipated, but we took a certain amount of risk because the market is never so low that it cannot go lower, and at present prices there will be less speculation on behalf of the merchants because there is a very long way down and a very little rise above 5s. in London.

Mr. James Morriss (Jennapullen) said:—We ought to feel very grateful to the Government for what they have done. It looks odd to us that 200 miles from the capital in an Eastern State wheat should be just as good as wheat in Northam. The bigger part of our wheat has gone to the Goldfields and, as a consequence, the millers have reaped the benefit. Nobody could blame them : they merely took advantage of their position. But I am very glad to see that there is a probability of an outlet being opened up for us so that in future our prices will be regulated by the prices ruling in London. I am very thankful, and I think all our farmers should be grateful to the Northam Agricultural Society for having brought this question up for discussion. It has been thoroughly thrashed out now by men who know more about it than I do. I think there is little now left to say.

Mr. Bernard replied to the debate, when the resolution was put to the meeting and carried unanimously.

At the invitation of the Chairman, *Mr. Chas. Harper* then read the following paper:—

"An observant person, travelling through the principal towns of Australasia, cannot but be struck by the magnificent warehouses and offices occupied by firms dealing in products of the soil. These firms are nearly all successors of men of rare ability, who by their intelligence, integrity, and business aptitude build up very large lucrative businesses out of the requirements and the products of the station and the farm. Australia has cause to be proud of these men, and no one should begrudge them the fortunes resulting from their enterprise. The personal friendliness, however, which grew up between the settlers and the founders of the businesses has gone with the men. The settler has now to deal with an official staff, governed by a board of directors. These directors have, in the interests of their shareholders, in many cases, obtained the agencies of foreign shipping companies, which are controlled by their boards of directors. The main duty of these directorates is to obtain the best possible dividends for their shareholders, irrespective of the interests of the settler or of the State in which he resides. Under these conditions it must be self-evident that to get the best returns for their labours farmers must rely upon their own united efforts, without any consideration for the interests of these firms. Modern conditions of inter-communication between all parts of the world now make it possible for the producer to choose for himself when and where his produce shall be sold, thereby securing to himself profits of trade which have hitherto gone elsewhere. A short time ago the following statement was made by the head of one of these large trading firms. Discussing the frozen meat trade, he said:—"We do a large business in this line, but we never buy until we are safe for an immediate sale. A man may come in and say, 'What will you give for 10,000 fat sheep fit for freezing?' We cable at once to London, ascertain what we can sell for, offer a price which will give us a profit,, make an offer. If he accepts we sell at once in London, but the shipments may be re-sold again and again, perhaps a dozen times, before it reaches London. This proves that there must be a considerable margin of profit between the price realised by the producer and that given by the distributor in London, and this is shared by a world of speculators. 'But how can this be prevented?' you may ask.

'By combination among producers,' I reply, and will prove it by an accomplished fact. Last year a few farmers combined, and sent about 400 carcases of frozen lambs to London. These carcases were consigned to a bank in London, with instructions that they should be sold to the best advantage. The speculators had no chance to come in, for they were placed in the hands of a meat salesman operating at Smithfield, who certainly did sell them to the best advantage. The important feature of this transaction which I desire to emphasise is that from start to finish the only deductions made from the gross returns were for services rendered, viz., slaughtering, freezing. freight, commission, etc. If this principle can be successfully adopted in dealing with frozen lambs, why cannot it be applied to the marketing of wheat ? A stage has now been reached in this State which offers an excellent opportunity for growers to adopt this course. A Government is in power keen to develop the progress of land settlement. A surplus of wheat is promised, estimated by the Minister for Agriculture at 500,000 bags, and wheat values are high. Under these conditions, a united effort on the part of wheat-growers—and the Government offers a splendid opportunity for success—the farmer to combine for export purposes, and the Government to assist by means of low railway freights and free storage at nearest ports. Should the Government be prepared to say to the wheat-growers collectively, 'If you will guarantee to export wheat on your own behalf, the Government will make special provision for railing to port and storing pending shipment, immediate confidence would be established, which would stir farmers into definite action. The knowledge that he could, by forwarding his wheat to the port, be placed in a position to draw in cash up to about 75 per cent. of the wheat's value pending sale, would make the course clear to many a farmer, while the effect upon the market would be such as to give the struggling farmer ready sale at full rates for local requirements. It cannot be too strongly impressed upon the farmers that once a shipload of wheat is guaranteed, the matter of securing the ship to carry it and the brokers to sell it is nowadays quite simple. The farmer is in just as good a position to obtain the full value of wheat as is the wealthiest firm in Australia. The man who possesses the freight, and that is the farmer holds the whiphand, if only he will use it in acting in conjunction with his brother farmers. The value of our wheat in London a few days ago was 38s. per quarter, and bearing in mind the shortness of the harvests just gathered in the Northern hemisphere, the contention is justified that no Northam farmer should sell his coming crop at under about 3s. 7d. per bushel at Northam station, as at that rate there would be a fair margin of profit for shipping, provided, of course, that the present rate in Europe is maintained. The strong combination which has taken place amongst breeders of lambs for export this season is gratifying to all those who desire to see breeders determined to secure for themselves full London values. From present information it would seem probable that about 5,000 or 6,000 lambs will pass through the freezing chambers for export. This should be sufficient to prevent any glut in the local market, and encourage breeders to extend the business for next year. A combination of wheat-growers acting upon the same lines, aided by the Government as suggested, cannot fail to secure to them those fuller values which is their due in return for the benefit their labours and enterprise are bringing to the State. A very encouraging movement in the direction of combination among farmers has taken place quite recently in the Katanning district. Wheat-growers in those parts were informed that providing that they would guarantee 20,000 or 30,000 bags of wheat for export a ship would be engaged to load at Albany. A meeting was held a few days ago to discuss the matter. The object was we learn taken up with enthusiasm, 4,000 bags being promised in the room, and undertakings given to push the matter throughout the Southern half of the district served by the Great Southern line. There is lying behind the project a development of deep signification. Supposing that a large portion of the promised surplus wheat is held under the control of a combination of growers, what is to prevent them from opening negotiations for the sale of flour outside the State? Having found buyers, why should they not then ask local millers to undertake gristing by contract, whereby large quantities of bran and pollard would be retained in the State, and be utilised in the production of butter and bacon? We are given to understand that there is milling power in the State equal to an output far beyond local requirements. It would be gratifying to all to see the mills working to their fullest capacity, and the export of large quantities of flour. Success through co-operation achieved in the above branches of farmers' products would give strong encouragement to fruitgrowers to follow the same course when the volume of their products overtops the local demand. That the future of wheat-growing, and to a considerable extent the development of stock-raising also depends upon full supplies of superphosphates, is not likely to be denied. To place this upon the farm at the lowest possible cost must necessarily be a prime factor in economical production. It is capable of easy demonstration that farmers exporting their wheat and importing their fertilisers under their own control, can place the latter on their farms at a fraction over cost price. The high price of sacks and bags for some time past has been a serious handicap to the farmer, and it is to be hoped that some united action may be taken by the farmers in Australia to protect themselves against the effects of the gambling spirits of Calcutta, and the freight combination of ship brokers. A recent discovery has made possible some economy in wheat sacks. The Government Analyst (Mr. Mann) was asked last year to suggest some means by which sacks used for carrying superphosphate could be protected from the destructive effects of the sulphuric acid contained in superphosphate. In this we are glad to learn that Mr. Mann has been eminently successful, so much so that after next seeding no superphosphate should be lost through the destruction of sacks, but in addition to that gain it is probable that sacks after being used for superphosphate, may be good enough for holding wheat retained on the farm for seeding and feeding purposes. Mr. Mann, for this discovery, is entitled to the sincere thanks of the farmer, and a suitable recognition by the State. Rust in wheat caused very serious losses in this State in the seventies. It has been rumoured that a few spops were detected last year in the crops in the Avon Valley. In this connection I desire to give the following experience. Last year a crop of Calcutta oats on the Swan was attacked by this disease, which had made considerable progress, and would, in all probability, have destroyed the crop. An application of sulphur dust, distributed at intervals, had the effect of causing the rust to form in a few days, painting the ground red and leaving the straw comparatively clean, and enabling the plant to produce a fair crop of grain.

Auction Sales of Chaff.

Mr. G. L. Throssell **said:—As a member of the Northam Agricultural Society I am very pleased to see such a large number in attendance this**

afternoon. During the past year our Society has endeavoured to hold monthly meetings in order to bring up matters of interest and discuss them among the members. Through the year we have had perhaps some difficulty in obtaining big attendances, but I am very pleased to see such an attendance to-day. The subjects we have for discussion no doubt have been the means of attracting so many people. We have representatives from all over the State from Nangeenan to Perth and Fremantle. I hope the result will be that we shall be able to place the farmers in a better position in the coming year than they have occupied in the past. My object in moving the resolution I have in my hand arises from a sincere desire to enable the farmers to obtain the best prices possible for their goods and not with the idea of denouncing the agents who handle the produce. I want to make that point particularly clear, because in the past no doubt the sales I refer to in the resolution have served a purpose, and that at a time when the supply was less than the demand. I think that at a time like that the open market is the proper place for such produce to be disposed of. The resolution is :—

> " That the Government be requested to prohibit the daily auction of produce in the Railway yards."

—The argument against this is that the man prepared to pay the highest price obtains the article and therefore this must be the right principle. That was right enough a few years ago when the supply was less than the demand, but to-day the system lends itself to questionable practices, of which there have been many painful evidences, resulting in loss to the producer. I have one particular instance in my mind, and that is a person in this town who sent a consignment of produce to one of the Goldfields firms, and the market dropped, and although the particular article was prime it was rejected simply because the market had fallen and not because of any fault in the article. Correspondence followed, the produce had to be disposed of and the unfortunate man got back for his truck of produce a shilling's worth of postage stamps. I merely mention this to emphasise the point that the system is extremely unwise and must result in great loss to the producer. Although it might be extremely difficult of proof, still appearances strongly support the contention that for a long time past there has been no real attempt made to obtain a fair price for the chaff : or if such is not the case then there has been a distinct understanding between the consumers that keen competition will not be indulged in. They know full well that the lines offered are in full supply, that they have been railed a considerable distance, that there is no storage accommodation, and that, consequently, the goods must be sold. What is the result ? Naturally enough three or four men who want the stuff get together and agree among themselves as to who shall buy to-day and who to-morrow. All that they buy is pooled and split up among themselves. That is a positive fact. Perhaps there is nothing illegal or positively wrong in this, but as producers we see that by these means we are losing heavily. No better system could have been suggested while the supply was behind the demand, but that time has now passed. The demand for wool is not yet overtaken, and it might be argued by those who favour the auction system that wool, skins, and the like are satisfactorily disposed of, and that if it were the best way of disposing of these lines it must also be the best way of disposing of wheat. But the cases are by no means on a footing, for with wool, fortunately, the demand is still much greater than the supply. Consequently with respect to wool the auction sales bring out a healthy competition. But it is with chaff that we are now dealing. Of course, daily auctions have their good points, chief of which is the prompt cash return. It is alone the necessity for having the cash that makes farmers continue this suicidal policy. So long as the necessity exists so long will matters of this kind have to be faced and allowance must be made for those who resort to auction sales under compulsion. And if this resolution be adopted and approved by the Minister for Railways, and the sales prohibited, will the position be improved? Not unless some system can be evolved to tide the farmer over the day of reckoning ; for the agents are keen business men and will not stand by and see this present system abolished. Private yards and sidings will very soon be laid down and sales will continue as before. Therefore we must go further and endeavour to devise some scheme for obtaining temporary advances for the farmers upon the security of their crops, either by the formation of a co-operative system or some other means. What is there to prevent the sale of produce by auction at such centres as Northam, York, and Beverley, where the seller and the buyer can be brought face to face? Then if the price offered does not meet with the approval of the seller he can refuse it and no harm is done. He would not be at the mercy of the little clique of buyers. In the past the sales of this sort have been chiefly confined to chaff. But with the prospects of an abundant harvest before us the question arises—How shall we handle our wheat to clear the best prices? With this commodity we now have to get upon the world's market and to see that we do get the full benefit of this is what we have to consider. In the past the agents have undertaken the handling of wheat in large parcels, and results have been satisfactory : but this year there will be a very much larger quantity, and we must endeavour to make still better arrangements to avoid the forcing down of the market. It is to be hoped this question will receive that attention and consideration which its importance merits. It should not be necessary to approach the Government on such questions as this, but I feel sure that if the necessity for doing so does arise we will find the Government most sympathetic and that Mr. Mitchell will do all in his power to assist us to bring about the desired results. This question is a very large one. Since being at this meeting we have received the following telegram from Pauley Bros., Boulder :—

> "Your efforts to prevent chaff being sent on consignment to auction have our sympathy. Trust you will be successful."

In addition to that, this letter also has been received from a well-known firm, whose name I need not mention at this juncture:—

> "With reference to the meeting in Northam to-morrow *re* the disposal "of chaff, I regret that I shall not be able to be present to support you "in your proposal to abolish the sale by auction of produce in the Perth "yards, but I may say that I cordially agree with you that the system "should be put an end to. There is no doubt whatever that the principal cause of the very low current rate during this past year has been "the fact that enormous quantities have come into the market, and buyers "knowing that the auctioneers had no storage have been able to get "their supplies at almost any figure they liked to offer. Another reason "why good stuff has been slaughtered so badly has been the fact that "buyers can nearly always discover even in the best trucks a bag or two "which is inferior and they of course secure the truck at the value of "the worst of it, as neither they nor the public generally know how

"much is bad and how much is good of the lot. In my opinion a great "improvement in prices would be effected if all consignments might be "unloaded into the Government sheds. There are one or two large "buildings available, we believe, in the yards. A charge of 1s. or 1s. 6d. "per ton might be made by the Railway Department, and a longer time "given during which consignees would endeavour to find buyers. "There would be no trouble about sampling the lines over and if a few "bags were bad it would not affect the sale of the balance as they could "be rejected if desired. Besides this the trade whose interests it is to "keep up prices as they have to buy direct from farmers to some extent "would purchase any stuff that was at all saleable at a fair price and "the farmer would receive the benefit. I quite recognise that my interest is the farmer's interest, and I have thought a good deal about "the matter and cannot think of any better means of improving things. "The above is the system adopted in Melbourne as far as I can hear "and it seems to work well there. I am quite aware that the firms are "purely auctioneers and do not buy chaff and will most likely oppose "this as they are only interested in getting their commission. There "is also another side to the question, and that is the unfairness of the "present mode to those produce merchants who have large stores, facilities for carting, etc. They are practically at the mercy of any man "who likes to take out an auctioneer's license, owing to the Government "allowing the railway yards to be used as an auction mart. Free "premises are provided and the auctioneer may have no rent, no office, "and no establishment to keep up. He is purely interested in getting "his commission, and the difference of 10s. and £1 in value is not to "be considered by him. So long as he can get the stuff away, his clients "feelings are a very secondary matter."

I move the resolution which I have read, and I do hope the question will receive the earnest consideration which its importance deserves.

Mr. James Morriss (Jennapullen) said:—I will second the resolution, for I am heartily sick of the present system. There is an understanding down below—"you let me have my lot to-day and I will let you have your lot to-morrow" (laughter). Why should we trust our chaff to the mercy of those fellows who give us just what they think proper? Then again, it is passed into storage, and the trimmings, when worked out—you might just as well make them a present of the stuff.

Mr F Cooke (Grass Valley): I will support this motion. These auction sales are nothing but downright robbery. I was in the auction yards last season and I saw chaff good enough for anything or any market sold for £3 a ton from Pingelly. He didn't make tucker out of it. It is not a case of export with chaff: it is a case of looking after your market when we have an over-supply. At the present time we see the chaff slaughtered right through the season, and at the latter end it is worse than ever, if possible, when with a thousand or two tons over we think if we don't get it in we shall get nothing for it. Why can't we arrange to keep the surplus over? It won't hurt it. At the present time they slit the chaff all round until they find a little rubbish in a bag and then condemn the lot. As a matter of fact the consumer won't grumble about a bag like that because he knows it is inevitable. I think if we could possibly do away with the auction sales we will get a system of genuine chaff dealing. It is an old saying that chaff is a thing, you won't get anything but paper for, but I have had the experience, this season, of handling cash for hay in a stack, and I don't see why we should not get it every time. There is no speculation in chaff so long as there are import prices to regulate it. If we do away with auctions half-a-dozen merchants will come in and buy our stuff and deal it out as required. The great fear with many of the farmers is that if we have not got prime quality we cannot sell it. That is not right, because if it is not prime it still has a value as cow feed.

Mr. W. J. Stewart said: I have been very pleased to hear the remarks of some of the speakers, and I will hail with pleasure if the day comes back to what it was when people who looked after the interests of the producer looked after them better than they are looked after at the present day. My firm is quite prepared to buy up 2,000 tons of chaff next year, but the man who wants the highest price must bring in the highest sample. For inferior stuff he must be prepared to take an inferior price. I shall not be buying in the stack. I shall buy the chaff here in Northam, and will give the farmers a higher price than they can get by sending it down to Perth. A few months ago I made careful inquiries in Sydney and Adelaide, and it is a thing unheard of there that auction sales should be held on Government reserves. They were surprised to hear that Western Australia, supposed to be up-to-date in so many respects, should be doing business on these lines. I think that if the farmer will see that his stuff is well cut up and is a first-class article, he will always command a higher price in Northam. If this auction business were done away with it would be a grand thing for the farmers right through the whole State.

Mr C. R. Knight said: I will support the motion. If the farmers could be induced to only place prime chaff on the market and feed the inferior stuff to their stock everybody would be better off. It would materially reduce the quantity going on to the market, and would greatly enhance the price. The present system of disposal in the open yards in Perth is highly unsatisfactory, and the only way to place the chaff market on a better footing is to do away with the open market in the Perth yard. I would like to suggest that this matter be left to the committee of the Northam Agricultural Society.

Mr. David Milne (Perth) said: For our part we have already considered this. As soon as it became known that you had called this meeting for the discussion of the question of the chaff auction sales and the advisability of asking the railways to prohibit those sales, a few of the produce merchants of Perth met together and considered this matter, and a resolution was passed at that meeting quite in accordance with your motion. (Applause.) I may state that it was carried unanimously. It has been long felt among the produce merchants of Perth that the true interests of the farmers and of the country have not been preserved by the auction sales: neither has the betterment of the produce business generally. We have come up here greatly interested, knowing that the success of the farmer is the success of the State. This chaff is not like wheat, for it has purely a local consumption, and, unfortunately, you have no world's market. You have to confine your sales practically to West Australia. Therefore it is a question merely of supply and demand, and, unfortunately, the supply has been too great for the consumption of the country. Another thing I would like to point out is the great variety of qualities of chaff forwarded to us, and the detrimental effect that the poorer qualities have upon the market generally. Unfortunately, gentlemen, the chaff grown in this country is not what it ought to be, and the farmers themselves are greatly to blame for the low price ruling to-day. We cannot sell inferior chaff in Perth at anything like a decent price. Another thing, the public go into the yard and buy against us. We have no option but to lie down and wait for them to secure their snaps before we can do business, because they will insist upon obtaining supplies from us at market rates. We have been referred to the prices obtained at auction for similar chaff. Thus we have been compelled to sit down and wait until we saw an article going at specially low value. This has a very detrimental effect upon the prices realised at auctions, and in our opinion it is unjust to the farmer, unjust to the produce merchants, and does not benefit the State as a whole. We will be only too pleased—speaking for the produce merchants in Perth—to meet your committee and discuss this matter, and I am sure the present feeling regarding this market has existed for a considerable time. It was about two years ago, at Show time, an endeavour was made to call a meeting of the farmers in Perth and discuss this matter. Only five farmers turned up. Needless to say nothing came of that meeting. Yet the meeting was published in every way possible. Notices were sent out to all agricultural societies, co-operation was asked among all the larger farmers, and although they all agreed that auction sales should be reconsidered, not sufficient interest was taken in it to make a practical start in that direction. I shall be only too pleased if your committee will arrange a meeting, and I can assure you you will be heartily met by the produce merchants of Perth, and an honest endeavour made to obtain for you and the farmers a just price for all your goods.

Mr. Wilson (Meckering) said: For my part I cannot understand how it is that we have the two methods of disposing of our chaff to-day. There is the private merchant and the auction sales. If the private merchant way is the best, why don't the farmers stop the auction sales by sending all their stuff to the private merchant ? I am not opposed to the motion, but at the same time I don't want to close this avenue of selling chaff.

Mr Milne said: As regards the disposal of chaff by private firms, it is impossible to compete against the auctions, because they are all at from day-to-day values. You find that early in autumn the price is £5 6s., while shortly afterwards it is £3 6s. As long as you have this irregular mode of supplying the market, and of placing your goods on the market, you will never get proper recompense for your growing of the hay.

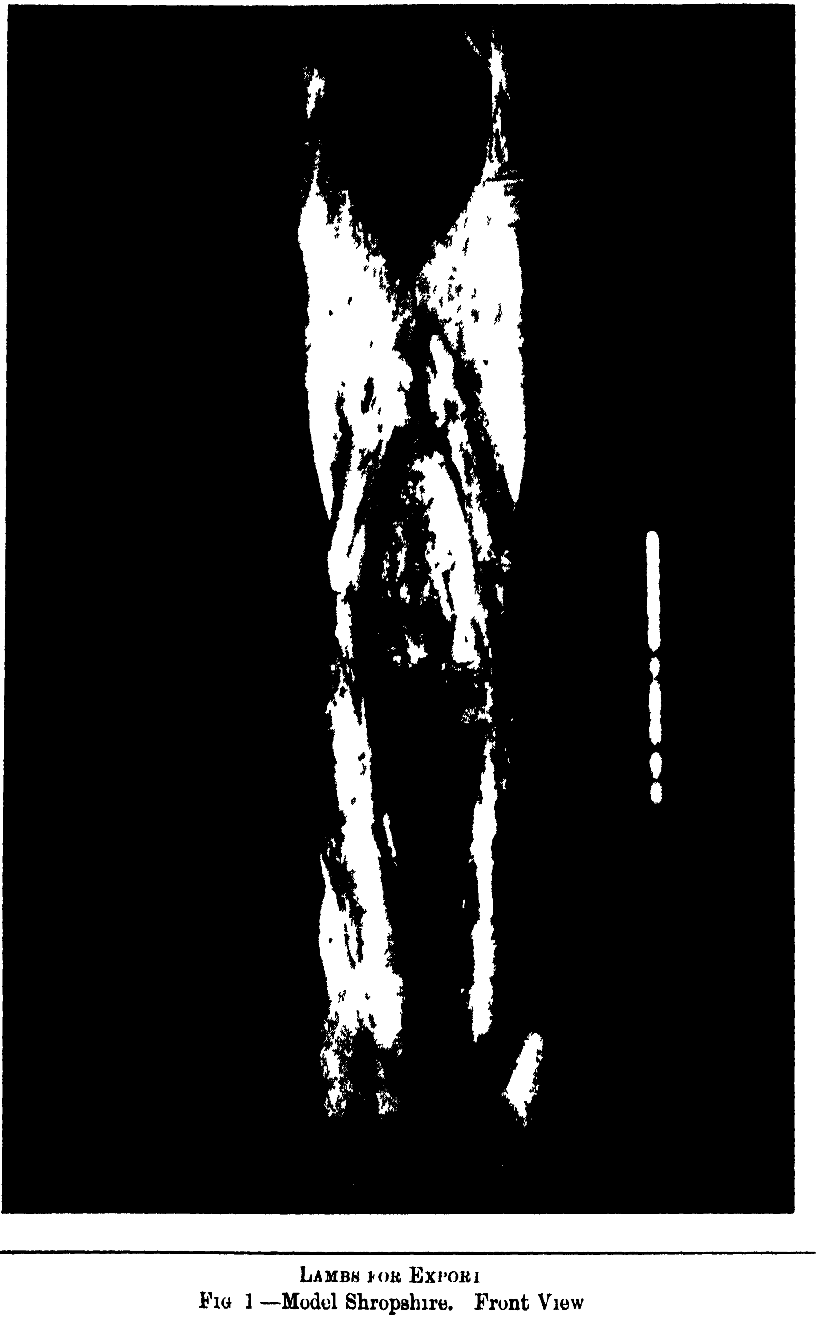
Mr. Marwick said: I would like to see a committee formed to formulate some workable scheme. I know the merchants of Perth would much sooner see the prime samples of chaff sold direct to them than mixed up and put on the market the way it is. A good deal of the blame lies with the farmer himself for the way he mixes his chaff. It is a case of supply and demand, and I know that the auctioneers have often advised the farmers not to send to a market that is already over-supplied. Still it goes there. Personally I have always been able to find an agent to come and buy mine. However, if the farmers would grade it themselves, and did not allow the mixed stuff to go off the farm, the result would be better all round. If some discrimination were shown, and the inferior grades kept for the farm, the price would keep up to a very much higher standard. It is a most necessary motion, but I think it ought to be referred to a committee.

Mr. Fitzgerald said: Well, if we block up this avenue of competition, what will we get in place of it ? I think the big people who can store the stuff will be free to do as they like. It requires considerable reflection before we ask the Government to block the auction sales in the railway yard. I certainly would not support the resolution unless the merchants would give us a guarantee to buy the stuff direct.

Mr. Henderson said: You must remember that the chaff auctioneers in Perth naturally want to get top prices for the farmers. Also those who buy outright desire to keep the market up. We are all in sympathy with this movement to get some better means of handling the chaff if possible, but personally, I think it would be rather foolish for this resolution to pass until you can discover some better means of handling the produce. If you can do that we will all welcome it.

Mr. R. Spavin (Guthrie & Co.) said: I think every auctioneer that handles or sells farmers' produce in Perth, is at least sincere in his efforts to do justice by the business entrusted to him. I have heard some imputations to-day of dishonesty or malpractice. I expect I am the oldest chaff auctioneer of Perth to-day, and I have never seen any evidences of that. I have done business with a good many gentlemen in this room, and I don't think anybody will say I have ever done business on any but straight lines. The low prices have been a disappointment not only to the farmers but to the agent. An agent who is working on a commission—his remuneration depends upon the amount of money that passes through his hands—hence his honest desire for keeping the prices up. But what, despite his energy, can an agent do with chaff streaming into the yards at a rate far beyond the capacity of the place to absorb it ? I don't refer to one day, or one week, or one month : you are producing too much altogether, and that is a fact. I draw my remuneration from selling chaff, but I hold no brief for auctions, although up to the present it has, in my opinion, been the best means of disposing of it. If I can give you any assistance in arriving at a solution of the difficulty I shall be glad to do so. It is just as disheartening for the auctioneer day by day to sell hundreds of tons of chaff and know that it is not going to pay the struggling farmer who grew it. Your present difficulty is this, that the farmer complains he is not getting enough out of his hay. The produce merchant also says he is not getting enough. Now you want two more cuts out of this hay—who is going to pay for them ? According to the statements made here to-day somebody is getting alarming bargains. Perhaps they are. Yet what is the position of people who buy the chaff ? Nine out of ten of them are in debt everywhere.

Mr. Vernon Hamersley, M.L.C., said : I think Mr. Knight's suggestion ought to be taken as an amendment, and the question postponed till a future meeting of your society. It could then be referred to a committee. I will move that a combined meeting of produce merchants, auctioneers, and farmers be arranged by the Northam Agricultural Society to be held during Northam week. If we do away with the auction system altogether you immediately place in the hands of the merchants the opportunity of fixing the price. Then when your farmer has sold his chaff to the merchant we get back to the same trouble that we had years ago when the merchant said—"Not up to sample; I hold it at your risk." All of us on the land has been face to face with that position, and that is why the chaff went to auction. It was the only way out of the difficulty short of allowing the merchant to take the



LAMBS FOR EXPORT

FIG 1 —Model Shropshire. Front View

chaff at his own price. One instance occurs to me of a man who sold his chaff at a satisfactory figure, and was told by the merchant "Not up to sample." The seller went along to the merchant's place of business, and as the merchant was not in the farmer got into conversation with the hands and made his inquiries as to price and quality. And he was told—of course they didn't know him—that his own chaff was the best in the place, and was realising top market value. Yet the merchant was audaciously trying to beat him on the price. Another instance I remember, the merchant, very anxious to make his purchase, was offering the enormous sum of £4 on chaff at a time when chaff was realising £7. We don't want to get back to that stage. Until we got the auction system the merchant was given an opportunity of making enormous profits, and I claim that even to-day under the auction system if the farmer is not getting the benefit of a high market the consumer is getting the advantage of a low one, It is a question between the producer and the consumer, as the auction system bids fair to bring the two together without the intervention of too many middlemen. It is a mistake to run away with the idea that there is no auction system in New South Wales and Victoria. I understand there are daily auction sales on trucks in Sydney, while in Melbourne they have the better system of each and every truck being unloaded and the samples overhauled. I am pleased to move this motion for postponement.

Mr. O. Wilson formally seconded.

After a brief discussion as to whether the original question (Mr. Throssell's resolution) should be referred to a committee or to another big meeting and, in the latter event, how the meeting was to be called—

It was resolved to adjourn that meeting to a day in Northam Week, the time of meeting to be fixed in accordance with the convenience of the majority of those then present.

LAMBS FOR EXPORT.

By A. D. Cairns.

Your Coolup correspondent's ingenuous inquiry on the subject of grading lambs for export, though apparently a modest request, is in reality a very large order indeed. His letter voices the common doubt of sheep-breeders the world over. Every pastoral or rural publication more or less runs its columns on one or the other phases of this problem. In some it resolves itself into the ever-old ever-new query, wool *versus* mutton; in others breed *versus* environment, while again, many a practical successful lamb-grower simply tells us that "half the breed of a fat lamb goes down its throat."

Sheep husbandry, one of the most ancient pastoral pursuits, took on new life immediately the refrigerating machine became a commercial success, and it is from the standpoint of the requirements of the Smithfield market in London, whose verdict, practice, and dictum guides and controls the lamb and mutton producer throughout the world, irrespective of his nationality, latitude, or distance from this centre, that we write. From the time that Capt. McCarthur imported his first Merino into New South Wales, early last century, up till the present, different breeds have had their partisans, and generally speaking, so far as Australia is concerned, wool is king still, and the Merino is impregnable for high class wool.

In New Zealand a more equal level is attained, as will be seen from the following round figures:—

1905. (Exported into United Kingdom.)

New Zealand wool production, 5½ million sterling; mutton production, 2½ million sterling.

Commonwealth wool production, 20 million sterling; mutton production, £1,111,969 sterling.

The extent of the preference of Australian pastoralists for wool up to the present time is readily gauged by the above figures, and the demand for Australian wool and mutton is on the increase.

Australia now produces one-fifth of the world's wool crop, and to all appearances is not likely, at least in the near future, to recede; on the contrary, the impetus given to lamb culture by the refrigerating machine, together with the practical methods now being adopted to keep the rabbits in check, not to mention that gigantic enterprise, the Murray Irrigation Scheme, all point to increased mutton and wool output.

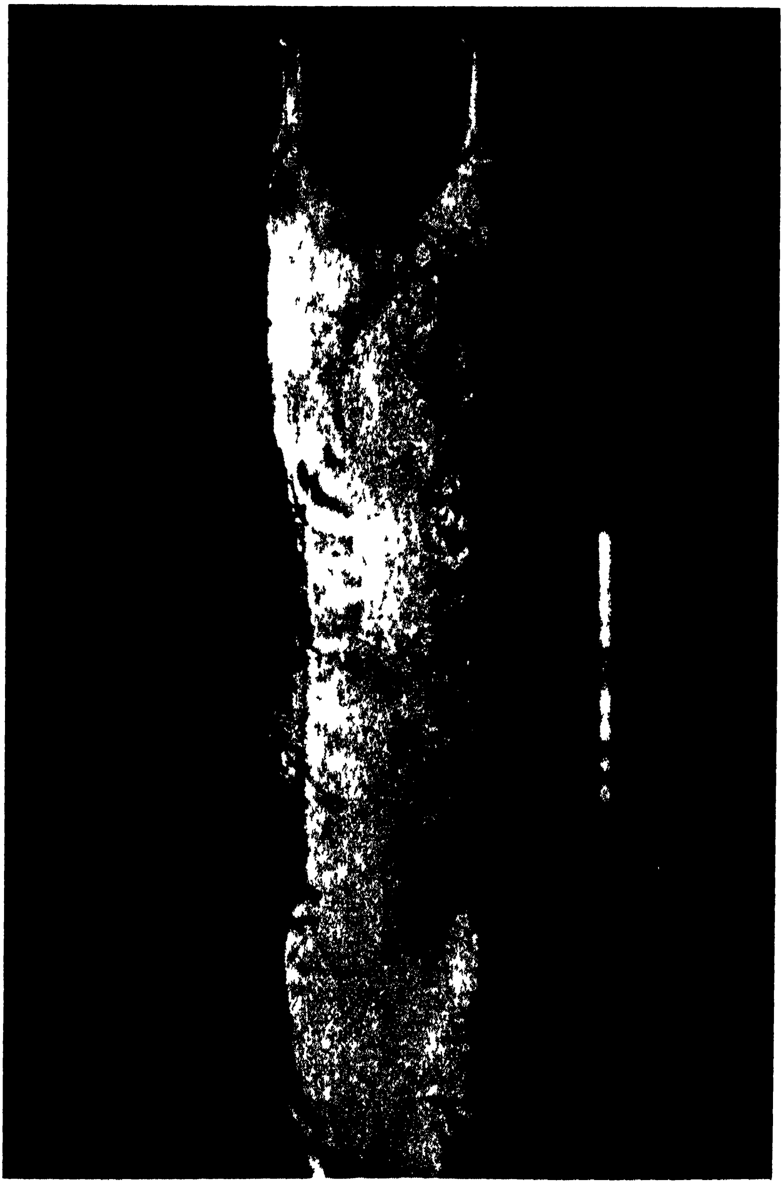
The refrigerating machine has changed the value of a carcase from a few pounds of tallow at 3½d. per lb. and a few ounces of trotter oil to an annual export of carcases which this year will nearly reach two millions sterling, without any appreciable reduction to the flocks.

However, a far more telling argument in favour of our pacing with the times can be gleaned from the Smithfield Statistician. He works out at the following round figures taken during the weekly market fluctuation, during the past eighteen years:—

New Zealand lamb has averaged 5 3/8d. per lb.
Australian lamb 4⅛d. per lb.

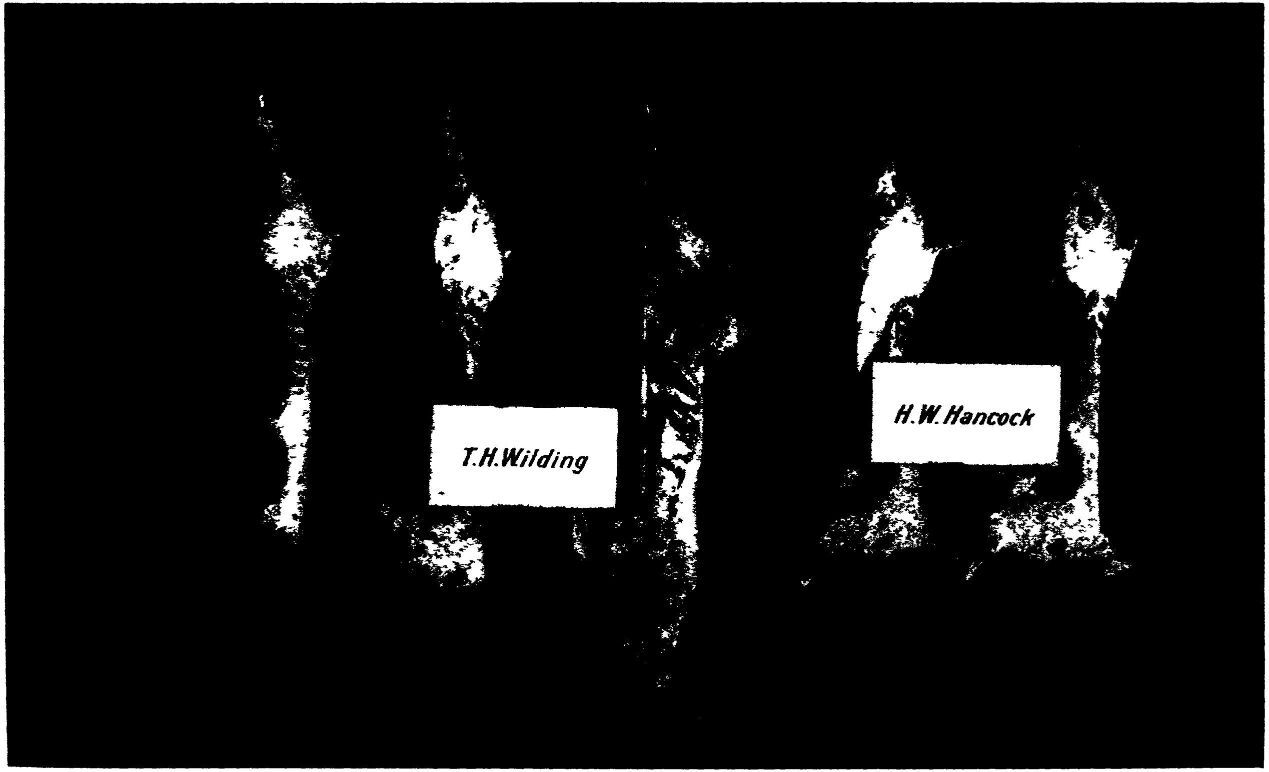
This table is in eighths during the whole of the period mentioned and, while exception may be taken at the apparent roughness of such a figure, it is probable that if even hundredths had been used the result would have been much different. Comparing Australia with Argentina for mutton, Smithfield figures show Argentina about as far behind Australia as the latter is behind New Zealand, while the quantity for 1906 is insignificant, 120,106 lambs being their total. However, they sent nearly three million frozen sheep, the average working out at : Argentina 3 9/16d, Australia 3 3/8d. (nearly) per lb. for 1906 operations. The figures so far as 1907 have gone tend to reverse the position, for the return for River Plate mutton has been at least one halfpenny lower latterly than Australian. Things generally point to considerable loss by South American meat operators this year, both in beef and mutton, and this depression may presage a corresponding rise in Australian meats.

The great things threatened by our powerful rival a couple of years ago are not likely to be so portentous as anticipated.



Lambs for Export

Fig 2.—Model Shropshire. Back View.



LAMBS FOR EXPORT.

FIG. 3.—Samples of Lambs exhibited at the late National Show at Northam. Side View.

The drain to supply a couple of million hindquarters of chilled beef or a couple million carcases of mutton up to the requirements of the Smithfield market annually have told their tale. Large concerns have had big losses, and herds have been taxed to keep up the grade. Reports of sheep troubles—foot rot, etc.—together with the keen rivalry of these companies, stud stock buyers at the principal stock sales and shows in Great Britain, all tend to show that no money is being spared to make good the thinned herds by an improved strain of beef and mutton stock acceptable to the British palate.

Australia having lain back with beef for the last few years will doubtless again be heard from at Smithfield. With mutton, which is more directly under notice, a much better prospect awaits. New Zealand has had a fairly bad season with dry weather, and the regular output is sure to be affected next season, in quantity if not quality. The world famous "Canterbury" mutton and lamb (to which all cold storage take off their hats) will have to be brought from beyond the Hills of Gore in the South, or from as far North as probably the banks of the Waikato. In either case the railway journey over these classic plains, or a couple of weeks or days on the famous grasses around the Cathedral City will instil the proper flavour into their meat. This is the great advantage of having a good brand. We look to the future for a W.A. brand of, say, " Mokine " or " Gascoyne," that will be synonymous with a delicate flavour imparted from the barley field of the one or the lupin paddock of the other. The main thing is to establish a permanent type of carcase, fed on a permanent fodder, so that when once the brand is established a fat lamb once passing through such favoured districts automatically acquires the stamp of blue blood; the hall-mark of untarnished descent that the British lamb connoisseur may go for it without any qualm of conscience.

Merinos, from the cold storage man's standpoint, are leggy and fat often inside ; their hindquarters also turn bluish after defrosting, which does not add to their appearance or value, through this lack of outside fat. When crossed with a Shropshire ram the result is a square compact carcase, with hindquarters well covered with fat which looks more inviting at all times. The thing to aim at in breeding or feeding is equal distribution of fat. A cold storage man cannot be called an authority on sheep husbandry, on fodder culture, but he runs his eye over the many thousands of the best work of the pastoralist and sheep farmer, and thereby gets a practical knowledge of types. He believes that first cross or half-bred mutton is the true Canterbury type, and that means the highest price in Smithfield ; also has common knowledge that cross-bred is worth anywhere up to half-a-crown per carcase more than a merino lamb of equal weight. He also sees prices for half wool selling as high as Merino. The significant figure already quoted on an eighteen years' run cannot be lightly cast aside, which is 1¼ per cent. difference in favour of New Zealand methods for the whole period in lamb culture.

Regarding the best cross, this is a matter often of preference, one sheep farmer meeting with success may find it best to use his own judgment. Sheep that thrive on the plains may develop defects in hilly country. To quote two instances from a New Zealand source. A sheep farmer writes:—

"Years ago people tried to grow Lincolns and failed. Now all the high country is stocked with Romney cross of some degree. The greatest difficulty seems to be that the wool gets very light after two or three crosses, and must have Lincoln to put weight into the fleece. The tacking back and forward is not satisfactory. The sheep get very uneven. Fully half this island is hilly and can never be ploughed, so that we must rear our lambs on grass if we are to keep a flock at all. . . . some farmers advocate the Corriedale cross, but anything with Merino blood is no good; their feet will not stand."

Again:—

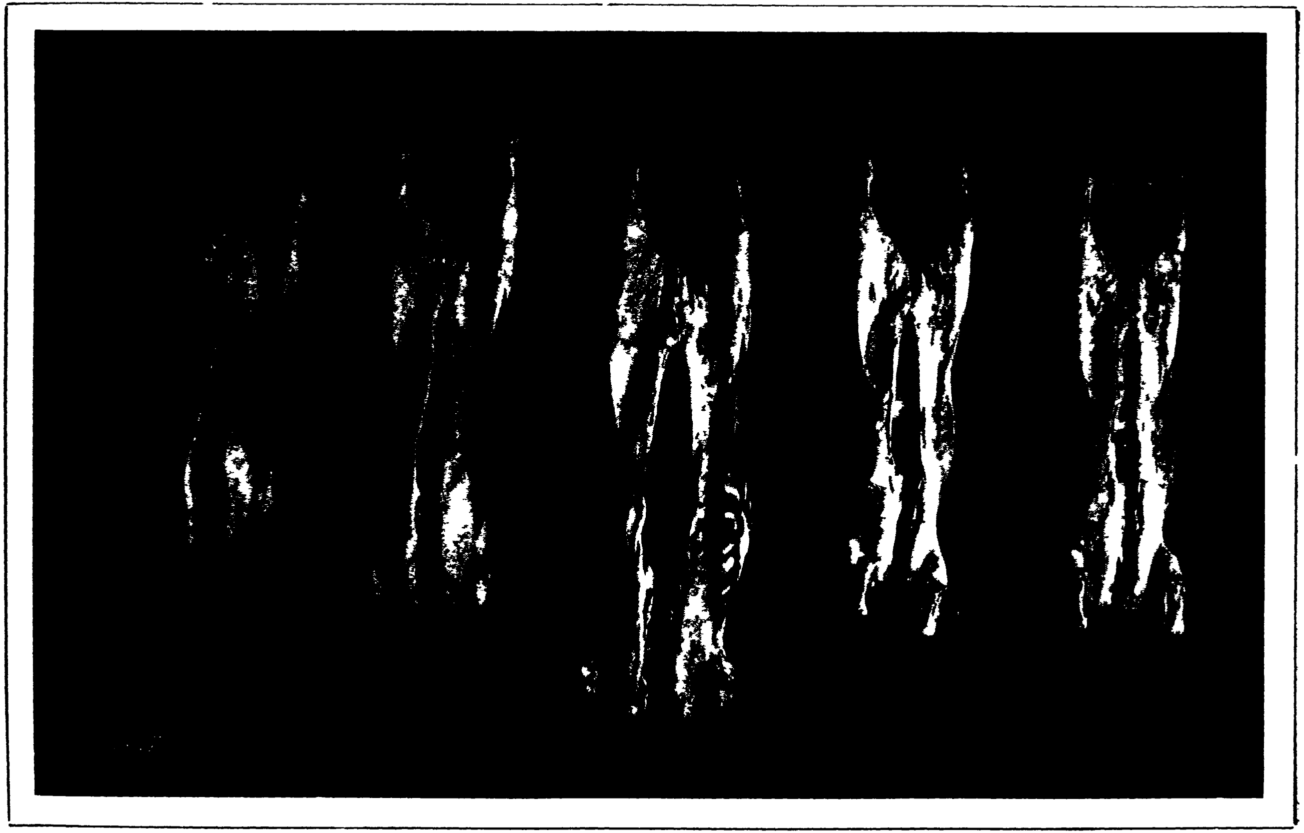
"A small farmer in North Canterbury last year had 268 lambs from 203 half-bred ewes, the lambs being by English Leicester and Down rams. The whole lambs were reared and sold at an average of 16s. 10d., total £220 10s., Wool cheque, £86, and the return from the 203 ewes was thus 30s. per head."

Coming to our own door, the late Producers' Conference brought out a mass of facts that could well be broadcast with advantage. One successful lamb raiser produced figures to show that in the Northam district his Lincoln-Merino ewes, with a Shropshire ram, netted him a little over £1 per head on hundreds of lambs ; another grower would put his faith in a fair Merino ewe alone, with the Shropshire of good strain. The Lincoln cross should certainly give quantity, and a large mutton carcase does not appear to bring a high price always. A lamb of the first grade of 28 to 34lbs. weight is always highest, the price receding as the weight increases. The sheep authority in one of our best stock columns says:—

"The Lincoln, for mutton purposes, is wasty, but the Lincoln-Merino ewe crossed with the Shropshire ram stands almost unrivalled. There is no doubt that the Lincoln has done a great deal in New Zealand and Argentina to raise the mutton export to its present height."

Mr. William Lowrie, B.Sc., Director of Canterbury Agricultural College, Lincoln, in his work on the Ewe Flock, says:—"It behoves the student of farming to endeavour to inform himself not only of the general management of a well-conducted flock, but also of the relative merits of different breeds or crosses—the general hardiness, fertility, ability to nurse, early maturing, fattening characteristics, etc. The breeding of stud sheep is for the few, the breeding ewe for the many is the cross-bred or half-bred. The term cross-bred, in popular use, has no definite import; it may mean the offspring of animals of distinct breeds or of a pure bred with a half-bred, or again, any mongrel whatever. The sub-division of large estates has been one of the causes of flocks deteriorating, so many small farmers working small flocks have developed inferior inbred stuff. That the popular ewe in Canterbury is the half-bred, the price at autumn sales sufficiently demonstrated. Either of the crosses, English, Leicester cross Merino, or Lincoln cross Merino meets the case well. . . The practice at the College is to use Border Leicester rams with half-bred ewes and to retain the ewe lambs for the cross-bred flock. For this cross-bred flock, Southdown rams are used, and these, big framed, early maturing ewes being first-class nurses, force along the lamb, and bring out in their progeny the beautiful conformation and prime quality which the Southdown imparts. Lambs, averaging 80lbs. live weight, dressed to 42½lbs. at the freezing works this year. The objection to Southdown is that it is late in reaching freezing weight."

These views of different authorities should give your correspondent some guidance in selection. Regarding the range of fodder for lambs, there is first the local herbs and natural grasses, from blue lupin to the many unclassified species. The cultivated fodder may range from Cape barley, rye, tares, oats, clover, rye grass (Italian) or rape, turnips, kale; the lambs or ewes changing ground as common sense dictates, from natural pasture to cultivated

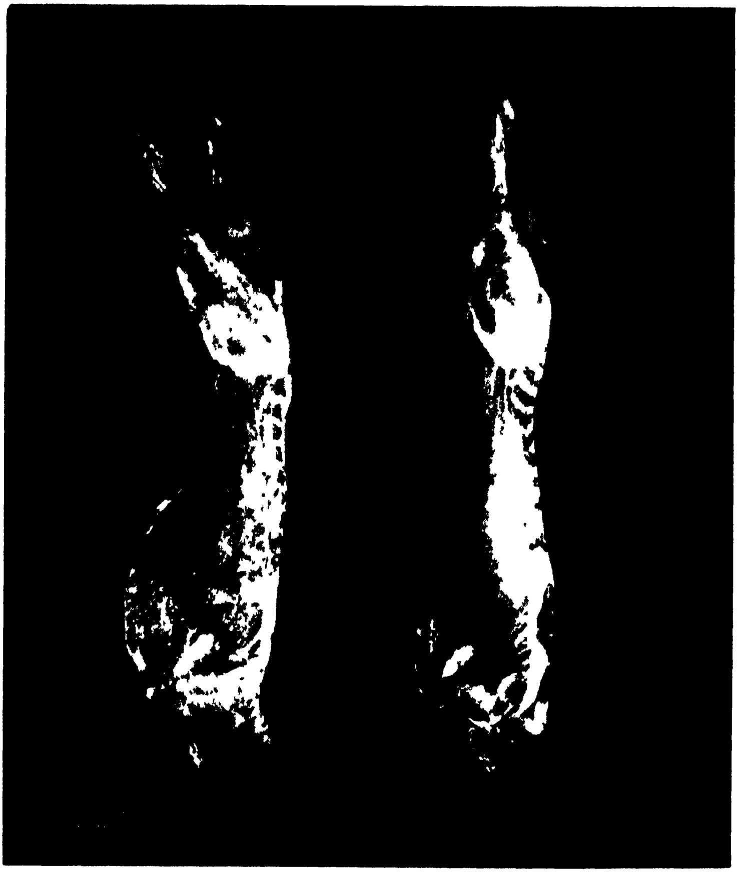


LAMBS FOR EXPORT.

FIG 4 —Samples of Lambs exhibited at the late National Show at Northam Front View.

Lambs for Export

Fig 5.—Samples of Lambs exhibited at the late National Show at Northam. Back View



LAMBS FOR EXPORT.

FIG. 6.—Eastern States Lambs that are rejected, but consumed in W.A. in large quantities.

area for topping off. Photos. herewith give a good idea of the cold storage man's requirements.

Figs. 1 and 2, front and back view of a model 28lbs. dressed weight, No. 1 grade Victorian Shropshire-Merino lamb, correctly dressed, with fore-legs and neck bound with string for freezing and to stow to smallest possible bulk.

Figs. 3, 4, and 5 are samples of lambs exhibited at the late Northam Show, fit for any market so far as type, weight, condition, or colour goes. Note the dressing is not quite correct.

The big wether in the centre is three years old and weighs 107lbs. This exhibit was from Lincoln-Merino ewe with Shropshire sire. Lambs ranging from 3 months old were started on rape and topped off with barley and oats. If half the breed went down these lambs' throats the other half was very good indeed.

Fig. 6 shows the sort of Eastern-reject lamb that is consumed in W.A. in large quantities.

If your correspondent files the *Journal* he will in a very short time have sufficient knowledge to turn out the goods as well as his neighbours. W.A. may yet develop a Burbanks to improve our natural herbage for lamb culture. Meanwhile, if the small grower by care keeps down his losses by tail searing and similar modern methods of making the best of what lies at his hand, he will find one good idea worth many acres, and the influx of low-grade Eastern stuff will be stemmed, while our mutton-laden ships will head out to sea Westward Ho.

POULTRY NOTES.

By Frank H. Robertson.

Table Poultry in America.

From Mr. Brown's report on the Poultry Industry in America, I continue to extract items of interest. He says that the quality of table poultry is much below that of England, and he did not see anywhere specimens comparing with the best fowls seen on English, French, or Belgian markets. If our methods of fattening have no other merit, they certainly give a finish to the birds, filling up the skin with fine mellow flesh. This lack of finish is evident everywhere, more so in some American markets than in others. Yellow-skinned birds are preferred to white, whereas the reverse prevails in Europe. The common idea in America is that yellow or creamy flesh is fuller in flavour, and, as a consequence, birds so distinguished command the highest rates. Mr. Brown regards this as altogether erroneous, and considers a white-skinned and fleshed bird has a delicacy of flavour and a richness of meat unknown to one which is yellow.

In Canada the preference is for white-fleshed birds, probably owing to the large number of British and French in that country. The predilection in favour of yellow flesh has controlled the class of fowls kept in the United States. For many years no race which had not this distinctive quality has attained any measure of popularity.

The demand for small chickens in our W.A. market is almost *nil,* and a pity it is so, for what is better eating, and yet one never sees such at any hotel or restaurant, and were the demand good for this class of bird it would be a welcome source of additional revenue, especially to the white leghorn breeder, who hatches as many useless cockerels as he does valuable pullets. This class of bird is known as the broiler, and Mr. Brown describes them as follows :—The term used designates a bird suitable for making what used to be called in England "spatchcock," that is, after the intestines are removed and the head, neck, and legs are cut off it is split along the back and laid out flat with breast upwards. In Europe cooking is generally done by dropping into boiling fat, the finest method for young chickens, or, as in America, by cooking on a grill in front of the fire. The weights vary from 1lb. to 2lb. each, dressed.

A specitl trade is also done in what are termed "soft roasters," by which is meant large birds, often capons, for which high prices are paid. The grades of table birds are as follows :—Squab broilers are usually leghorns, small, and large broilers wyandottes or plymouth rocks ; small roasters plymouth rocks, large roasters light brahmas.

Systems of Feeding.

An especially interesting chapter in Mr. Brown's book is that relating to new feeding systems, particularly as regards dry mash and hopper feeding. He says that to American poultry breeders we are indebted for the method of dry feeding, by which is meant the placing of small seeds and broken corn in cut chaff, thus compelling the birds to work for their food, a system which has made possible the artificial rearing of chickens on a large scale, with a very small percentage of mortality. We have seen, however, that one result of dry feeding is that the crops of birds so reared do not expand to the same extent as when moist food is supplied, and they cannot, at a later stage, be crammed to the degree necessary for making first-class table poultry. Whether the dry mash described below will overcome this difficulty can only be determined by experiment.

Dry Mash.

That is food given in the meal form without added moisture. This is entirely against all previous ideas, both in Europe and America. It has been customary to feed grain dry, whether on the ground, in troughs, or among litter, but whenever meal is used, the plan universally adopted is to mix this with water, preferably hot, and give in the form of a crumbly paste, called soft food with us, and wet mash in America. The reasons for use of food so prepared are that it is more easily digested than the whole grain, that some materials would not be assimilated at all in the body unless the fibre is broken down in this way, and that certain foods, as also hard vegetables, would be useless unless softened by steeping or cooking. These ideas have been firmly held by progressive poultry keepers, who also believe that a warm morning feed in winter promotes laying. In the light, however, of what is now being done in America, I certainly saw enough to say that British poultry breeders will do well to try the dry mash method.

Hopper Feeding.

A further contravention of all the canons hitherto accepted is that the food is kept before the birds all the time, so that they eat whatever they like. These hoppers are of wood, consisting of the reservoir with a sloping lid, and below it a tray into which the food falls. As the birds consume it more comes down, so that the action is automatic. In some cases these hoppers are made in three sections, one for a mixture of meals, one for beef scrap, and the third for bran, so that the birds can help themselves to whichever they like. But in others all the various ingredients are mixed in one hopper. Where the grain is scattered in the litter there is a double choice, as the inmates can either supply themselves from the hopper without exertion, or they can scratch for the grain. By this system it is stated that each bird gets its full share. There is no wild scramble for the heaps of wet mash in the trough. A bird goes to the food hopper and eats two or three mouthfuls of the dry mash, taking time to turn over and properly moisten with saliva, and then turns away to scratch for other bits, as a seed or two, or a grain of wheat, or oats, or barley, or kernel of corn; there is ample time for each bird to help herself to all she wants. The pith of the argument for dry feeding lies in that eating slowly, a bit at a time, first a mouthful of dry mash, then a bit of grain, then to the drinking fountain for a sip of water. It does not take us long to discern that this is exactly the way the fowl or chick eats when running wild and finding its food bit by bit. It is Nature's way for a bird to feed, and if we but do our part in supplying the essential food elements so that the birds can take what they want, and as they want it, the conditions seem to be right for them to eat in the natural way, and they will eat no more than they want, and eat it in the way their systems can best appropriate it. The saving of labour by this system is considerable. Mr. Brown concludes his remarks on this novel mode of feeding by saying that whilst recommending test of the system of hopper feeding of dry mash in combination with grain scattered in litter, the latter to compel exercise, to the attention of British poultry farmers, the question requires careful experiment ere I could advocate the entire abandonment of our present methods. But sufficient has been stated to show that it deserves our earnest attention.

Why do Cocks crow and Hens cackle

is a question of but little moment, and one which I do not recollect having been referred to by poultry talkers or writers. The subject was recently brought particularly under my notice as the result of a conversation with a student on our farm here who had spent many years in India. *Inter alia* the jungle fowls came under discussion, and in asking for particulars as to what they were like, he could not tell me. He had many times heard the cocks crowing, but had never been able to get a sight of the birds, owing to the thickness of the jungle undergrowth which they inhabit. Birds living under such conditions render it necessary that there should be some means of knowing each other's whereabouts.

All domestic poultry are descended from the jungle fowl (*Galus Bankiva*), and with them has, of course, come the note of call which remains with undiminished vigour. The use of call we can easily understand, when one remembers the conditions under which the wild birds exist. They keep in small flocks, headed by a single male, and travel over a considerable area in search of their natural food, which is found on the ground.

Birds which take to the wing have ample means of keeping in touch with each other, and large ground varieties, such as the emu and ostrich, only inhabit the plains and can easily keep in view of their own.

The hens, which are at times detained from wandering owing to stoppages for egg-laying purposes, find it necessary to advise the rest of the flock of their whereabouts, and this is managed by a lusty cackle on depositing the egg. The cock bird of domestic poultry will often be noticed to come and express his approval of what has happened by sundry mutterings and splutterings in hen language, which is, no doubt, a traditional emotion handed down from the original stock.

As to why the cock birds indulge in nocturnal crowing, it is rather more difficult to come to a logical conclusion, so one can but hazard the conjecture that it may be akin to the old watchman's cry of "All's well" at various intervals during the hours of darkness.

SECOND EGG-LAYING COMPETITION AT SUBIACO.

[Commenced July 1, 1907.]

The following are the results up to September 30:—

The figures in black indicate the highest for the month.

The first column of figures shows the present position of the pens in the competition.

Fowls.

Six pullets and one male bird in each pen.

	Owners and Breed.	July.	Aug.	Sept.	Total.
1	J. Stuart, Golden Wyandotte	**126**	143	146	415
2	Mrs. H. M. Kelley, Golden Wyandotte ...	123	141	148	412
3	A. H. Padman (S.A.), White Leghorn ...	106	145	147	398
4	J. and T. Robertson, White Leghorn ...	111	137	150	398
5	O.K. Poultry Yards, White Leghorn ...	116	141	140	397
6	J. D. Wilson, Brown Leghorn	117	129	140	386
7	C. R. Herbert, White Leghorn	101	138	147	386
8	F. Mason, White Leghorn	115	127	140	382
9	Sunnyhurst (S.A.), White Leghorn ...	78	150	**153**	381
10	S. Craig, White Leghorn	108	130	141	379
11	L. Dobson, Silver Wyandotte	119	132	127	378
12	Craig Bros, White Leghorn	99	137	140	376
13	Glendonald P.F., Golden Wyandotte ...	74	**159**	141	374
14	North Lake Egg Farm, White Leghorn ...	103	125	143	371
15	O. James, White Leghorn	87	140	131	358
16	A. and G. Buttsworth, Black Orpington ...	107	116	128	351
17	Coolgardie Poultry Farm, White Leghorn	87	126	136	349
18	A. F. Farrant, Buff Orpington	120	121	107	348
19	Bassett and Titterton, White Leghorn ...	75	136	136	347
20	Perth Poultry Farm, White Leghorn ...	97	115	134	346
21	Savage and Jones, White Leghorn ...	104	109	131	344
22	J. Faulkner, White Leghorn	77	129	136	342
23	Mrs. M. Hughes, White Leghorn ...	62	137	143	342
24	Mrs. McGree, White Wyandotte	66	135	140	341
25	Mrs. H. J. France, White Leghorn ...	60	135	145	340
26	Scottish-American P.F., White Leghorn ...	81	115	142	338
27	J. Stuart, Buff Orpington	76	132	125	333
28	A. F. Farrant, Partridge Wyandotte ...	108	115	108	331
29	J. R. Parkes, Brown Leghorn	94	104	132	330

Fowls—*continued.*

	Owners and Breed.	July.	Aug.	Sept.	Total.
30	G. George, White Leghorn	91	100	138	329
31	Chas. Thomas, White Leghorn	90	106	131	327
32	E. E. Ranford, Minorca	67	122	136	325
33	White Wings P.Y., White Leghorn ...	106	76	141	323
34	Austin and Thomas, White Leghorn ...	88	100	131	319
35	F. E. Tull, White Leghorn	85	114	113	312
36	Digby Poultry Yard, Brown Leghorn ...	53	121	136	310
37	Master Staines, R.C. Brown Leghorn ...	58	126	124	308
38	E. Kraehler, R.C. Brown Leghorn	73	111	123	307
39	C. W. Johnson, White Leghorn	65	111	131	307
40	A. F. Farrant, White Wyandotte	70	111	123	304
41	Adelaide Yard, White Leghorn	67	97	133	297
42	B. Tonkin, White Leghorn	68	101	126	295
43	O.K. Poultry Yard, R.C. Brown Leghorn ...	66	112	113	291
44	Sunnyhurst (S.A.), Black Orpington ...	61	111	119	291
45	R. A. Dusting, Minorca	51	118	121	290
46	Adelaide P.Y., R.C. Brown Leghorn ...	56	98	129	283
47	Scottish-American P F., Brown Leghorn ...	66	102	106	274
48	J. Stuart, Silver-pencilled Wyandotte ...	27	125	122	274
49	G. M. Buttsworth, White Leghorn... ...	51	125	97	273
50	Jas. Kirk, Silver Wyandotte	50	118	102	270
51	G. A. Innes, White Leghorn	44	82	144	270
52	J. Stuart, White Rocks	65	99	104	268
53	Mrs. H. M. Kelley, White Leghorn ...	40	100	125	265
54	Buff Poultry Farm, Buff Orpington ...	57	99	100	256
55	B. Jones, White Leghorn	16	100	135	251
56	Thamar Poultry Farm, White Leghorn ...	50	104	91	245
57	W. R. Read, Golden Wyandotte	49	89	103	241
58	Honnor and Forbes, Minorca	12	91	129	232
59	L. Despeissis, Houdan	64	73	82	219
60	Craig Bros., Black Orpington	23	80	110	213
61	D. Young, Black Orpington	14	73	118	205
62	A. F. Spencer, White Leghorn	27	62	102	191
63	Mrs. E. Byass, Salmon Faverolles	29	54	96	179
64	Non-competitive, crossbreds	0	62	81	143
	Total	4,696	7,272	8,092	20,060

Winner of first monthly prize, J. Stuart, Golden Wyandotte, 126 eggs; second month, Glendonald Poultry Yard (E. W. Stanes), 159; third month, Sunnyhurst, W.L., 153 eggs.

Winner of first three months' test, J. Stuart, Golden Wyandottes, 415 eggs.

Ducks.

Six ducks and one drake in each pen.

	Owners and Breed.	July.	Aug.	Sept.	Total.
1	G. Thomson, Indian Runner	160	177	163	500
2	R. A. Dusting, Indian Runner	114	182	167	463
3	Mrs. H. J. France, Indian Runner	145	156	161	462
4	Scottish-American P.F., Indian Runner ...	120	175	158	453
5	F. King, Indian Runner	109	174	165	448
6	Austin and Thomas, Indian Runner ...	119	137	148	404
7	Adelaide Poultry Yard, Indian Runner ...	47	160	173	380
8	White Wings P. Yard, Buff Orpington ...	60	158	157	375
9	C. W. Johnson, Indian Runner	105	136	129	370
10	South Perth P. Co., Pekin (No. 2)	35	157	170	362
11	A. J. Walters, Buff Orpington	93	135	130	358
12	L. Mellen, Indian Runner	44	137	165	346
13	M. Kynaston, Indian Runner	75	99	144	318
14	D. F. Vincent, Indian Runner	49	109	158	316
15	Smith and Davenport (Vic.), Indian Runner	0	129	166	295
16	J. and T. Robertson, Indian Runner ...	54	117	123	294

DUCKS—*continued.*

	Owners and Breed.	July.	Aug.	Sept.	Total.
17	S. A. McColl, Buff Orpington	11	127	155	293
18	E. Tremberth, Pekin	8	88	173	269
19	South Perth P. Co., Pekin (No. 1) ...	0	68	165	233
20	North Lake Egg Farm, Indian Runner ...	0	58	157	215
21	T. Anderton, Indian Runner	11	32	165	208
22	Bon Accord, Buff Orpington	9	1	113	123
	Total	1,368	2,712	3,405	7,485

Winner of first monthly prize of 10s., G. Thomson, Indian Runners, 160 eggs; second money, R. A. Dusting, Indian Runners, 182; third month, Adelaide Poultry Yard, Indian Runners, and E. Tremberth, Pekins, equal, 173 eggs.

Winner of first three months' test, G. Thomson, Indian Runners, 500 eggs.

FACTORY DAIRYING AND CO-OPERATIVE. DAIRY COMPANIES

By J. A. KINSELLA.

INTRODUCTION.

As dairying on the factory or co-operative system is practically a new industry in this State, I take it that there is no time when information of a practical nature on this question will be of more value to dairy farmers than at this the initial stage.

I would like to make it clear at the outset that I am not basing my calculations and propositions on this question from what I have read in books. The facts which I am going to lay before you as farmers have been gained from a long experience in organising dairying and co-operative dairy companies in Australasia and other countries.

In most countries where dairying is carried on to any great extent, the factory system of manufacturing butter and cheese is being generally adopted.

The benefits to be derived from the factory system as opposed to small private dairies on the farm, briefly summed up, are as follows:—

(1.) A more uniform product of a much higher average quality ;

(2.) A great saving of labour by concentration and the use of up-to-date power machinery, and the relief of the household from the onerous duties of butter or cheese making ;

(3.) The saving of capital by constructing one large factory as against the cost of individual plants for each farmer;

(4.) The value of the spirit of emulation, which is engendered by the dairy farmers coming into closer contact with each other, and of their being able to compare notes as to the relative returns from their individual cows and herds.

As it is hoped that new districts will continue to be gradually cleared of the timber, and that large tracts of land will be opened up for close settlement, and also that the number of settlers in the older districts of the State must surely increase in numbers, there is, in my opinion, every reason to believe that the near future will see a fairly large expansion in the production of butter in this State.

Centralisation.

I hope the dairy farmers in this State will not make the serious mistake which has been made in some other countries which I have had experience in, that is of establishing too many small factories.

The smaller the factories are the less gain there is over the original single dairy on the farm.

If the principle of the factory or co-operative system is correct, which is beyond question, the larger the factory is within reasonable limits, the greater the gain thereby.

In a district where it is not possible to get the milk or cream from a sufficient number of cows collected together at a convenient centre, so as to warrant the formation of a strong company, and to enable the erection of a thoroughly up-to-date factory, and to equip same with first-class machinery, which latter is important in order to prevent losses in the manufacture, it is much better for the dairy farmers to cart their milk or cream a longer distance to an already established factory, or to a branch separating station of such factory. As an alternative, however, two or three such districts could combine and erect a thoroughly up-to-date factory in a central position. Then separating stations could be established in the outlying districts, which latter would serve the suppliers in such districts just as well as though they were supplying direct to the central factory.

I am aware that the time is hardly ripe in this State for starting on the separating station plan, and that at least for some time we must calculate on doing the separating on the farms; particularly will this be the case where the districts are not thickly peopled.

For future reference, and with a view to keeping before our dairymen the importance of our some day running the dairy business in this State on the separating plan, I beg to point out the main advantages of the separating station system:—

(1.) There is practically no limit to the extent of such a business in good dairy country.

(2.) When a large number of farmers form themselves into a strong co-operative company, the initial cost is less for each individual farmer, and the larger the milk and cream supply when the business is conducted on proper lines, the lower should be the cost of manufacture.

(3.) A large dairy company is in a position to build a more substantial and better factory on the most up-to-date lines, and to secure the best butter-maker, which is of great importance, to whom they can afford to pay higher wages than the smaller factory can.

(4.) A large output means greater uniformity in the quality of the manufactured article for which a higher price can be obtained.

The Formation of a Co-operative Dairy Company.

The necessary steps before undertaking the formation of a company in a new district is first to make a thorough canvass of the district in order to ascertain if there is a sufficient supply of milk or cream in the district to insure the success of a factory, and also to find out the amount of support, both in shares and co-operative influence that would be received from the farmers to establish a business amongst themselves. In all well-conducted dairy companies, as a general rule, it is found advisable that the whole of the required capital be subscribed by milk and cream suppliers only. Experience in the past has taught that where outside capital has been employed, friction has sooner or later occurred between the shareholders who were milk suppliers and those who were not. If, however, it should be necessary or expedient to permit the outside public to subscribe a portion of the necessary capital, provision should be made in the articles of association for the limitation of dividends, the creation of a reserve fund, and the safeguarding of the milk and cream suppliers' interests. The registration of the company, the drafting of memorandum and articles of association, are always best entrusted for final completion to a solicitor.

The amount of Capital required.

The amount of capital necessary is determined by the size and nature of the factory and business to be established. Generally speaking the capital for a single factory is fixed at £2,200 to £3,000. If operations are contemplated to cover a large district, and enough milk is available to make separating stations desirable, a correspondingly larger capital is necessary. Even if the whole of the above-mentioned sum is not required, the holding of a little surplus capital will very often result in a great saving of expense and trouble in later years.

It often happens that dairy company which has fixed a small capital wishes to make improvements or important extensions, and is not able to do so, not having sufficient funds available. To my personal knowledge I have known many dairy companies with a small capital that would keep putting off important repairs and improvements rather than go to the trouble of increasing their share capital.

By doing this they would often be sustaining large losses in the manufacture, which would be the fault of inefficient machinery, and which was often blamed on the butter maker. In many cases I have seen the continued making of an inferior article of butter, and the cost of manufacture much larger than it should be, owing to the butter maker not being supplied with a refrigerating machine and proper ripening and cream cooling vats.

How the Capital is usually raised.

In most new districts it is not usually convenient to the average small dairy farmer to pay up in cash the amount of the shares he takes. As preliminary expenses have to be met, and the factory has to be erected and paid for, a small amount is called up, usually 2s. 6d. per £1 share, and arrangements are entered into with a bank to obtain an overdraft for the balance of the necessary capital.

In some cases nothing is paid on allotment, and the whole of the money required is obtained on overdraft.

As security to the bank, it is customary for the directors, or all the shareholders of the company, to give a guarantee to the bank for the amount borrowed, with a lien over the buildings and machinery when erected ; and the uncalled capital affords additional security.

In order to provide interest and sinking fund for the repayment of this overdraft a small sum, generally ¼d. per gallon of milk, or ⅝ of a penny per pound of butter fat, is deducted from the amount payable to each supplier for his month's milk or cream and placed to the credit of his capital account. It will therefore be readily understood that the more milk and cream the suppliers deliver to their own co-operative factory the sooner will the overdraft be paid off, and they as guarantors released.

Important Essentials to Success.

In ordinary dairy factory work the working expenses are nearly the same whether the supply of milk be 300 or 600 gallons daily.

Above 600 and up to 1,500 gallons the working expenses increase but very slightly—not by any means proportionately to the increase in the supply. The larger the supply the smaller should be the cost per pound of butter manufactured.

The smallest number of cows with which it is at all safe to begin co-operative dairying may be set down at four hundred, and this would mean good cows; with only medium cows it would be wise to have five or six hundred. While this is true, I have had to do with starting a factory in a new and fast-growing district where the farmers started with 250 first-class cows, and in three years they were a sound working concern, which was started on the lines above indicated.

If, however, at least 400 good cows are available, and this number gradually increased, the working expenses may be found to absorb so large a proportion of the receipts that the suppliers will not receive a fair or profitable price for their milk or cream.

The Location and Site.

It is of great importance to have the factory located as nearly central as is possible for the districts which are to be served.

The question of roads and shipping facilities should not be overlooked. If access to a railway siding can be got it often means a saving in cartage and handling; besides facilitating the work,

The matter of a site for the building is of infinitely greater importance than that of location. In the selection of a site, the advice of a competent person who has had experience in butter factory management should be secured if possible.

From a business point of view, and for the success of the concern, it is better that the suppliers should cart their milk or cream a longer distance than to have the factory erected on an unsuitable site with everything against it but its central position. A first-class site will be: (1), abundantly supplied with pure water ; (2), on high land, so that the surroundings may be kept dry and free from mud and water pools ; (3), suitable for effective drainage.

Pure Water Supply.

I have found from my varied practical experience that no factory can hope to make first-class butter or cheese unless supplied with the purest of water.

Many cases of bad flavour, or rapid deterioration in the keeping quality of butter have been traced directly to the use of impure water in the manufacture. It is not always the water which has the most offensive smell or taste which is the most dangerous. It should be ascertained beyond any doubt if a proper and abundant supply is available before the site is finally decided upon.

It is very important that a chemical and bacteriological analysis be made of the water to be used for a new butter factory company. I have no doubt but what the Department of Agriculture would undertake to have such analysis made for the directors of any new company.

For a bacteriological analysis at least two quarts of water should be forwarded in a bottle with a ground-joint stopper, or closed and sealed with a new cork stopper, which should, together with bottle, be sterilised by boiling, and afterwards placed in a hot oven, for a few minutes. In taking samples of water, if drawn from a well through pipes, the water should be allowed to run for a time so as to avoid taking water which has lain in the pipes. As bacteria play such an important part in the keeping quality and the flavour of butter, the question of introducing undesirable germs into the cream and the resulting butter through the medium of inferior water should not be overlooked by the directors when erecting a new factory.

Water for Motive Power.

Although I am not familiar with the rivers and streams in this State, it might be found possible in some districts to utilise this cheap means of motive power.

In some countries I have seen factories built on the banks of rivers and swift-running streams, and although their fuel bill with a large concern would run up to £200 per annum, they did not take advantage of the water power. By installing a water turbine all the machinery could be driven and this expense for fuel largely avoided.

Erection of Buildings.

In building a factory, or the making of extensive alterations to any existing one, the work should be entrusted to some person thoroughly qualified to direct the operations on the most up-to-date lines.

I have known many examples where large sums of money were absolutely wasted for the farmers in the erection of new factories.

Yet one finds cases where factory proprietors and co-operative companies still entrust such work, involving large amounts of money, to persons who are totally incompetent.

To avoid such mistakes being made in this State, I would be prepared to supply any new company starting with a sketch plan drafted on modern lines, free of cost. Such plan could be entrusted to an architect or builder, and reduced in size to suit the requirements of the company, keeping in mind, however, the main principles of the plan, which would provide for cheaply extending as the business of the company demanded, or as the output increased.

Selection of the Plant.

This is a matter of very considerable importance, and one which calls for a few words of general advice.

Many mistakes have been made and much money lost by the installation of unsuitable and inefficient machinery and appliances; and although it is impossible for any Government department to name the best makers or machines, still, no exception can be taken on reasonable grounds to general specifications being given ; such specifications serve as a guide to directors in making their purchases, and very often save trouble and needless expense.

Many people in starting a new factory are under the impression that any kind of a building and make-shift plant is good enough to start with. While I would not recommend too elaborate a building and plant, it is very poor economy indeed, when equipping a factory or separating station, to instal old or obsolete machinery because it is found cheapest ; yet we find this is very often done, and many factories losing more money in one year through the use of inefficient and defective machinery than would be required to equip them with up-to-date appliances. Losses of butter fat in the skim milk and butter milk, and deterioration in the quality of the manufactured article, can only be controlled by the butter-maker being supplied with first class separators, proper cream ripening and cooling vats, and a refrigerator for chilling the cream, and wash water for the butter, and for holding the butter at a low temperature until it is disposed of.

Another error is to insert too small a boiler, with the result that in two or three years a larger one has to be procured and the second-hand one sold at a sacrifice. It is poor economy to buy a small boiler, for, apart from the prime cost, it is actually cheaper to have a larger boiler. Steam can be more easily kept up in a large boiler, and the whole work is done at a lower pressure without forcing the firing. Owing to the fact that such a large quantity of hot water and steam is necessary to keep everything in and about a butter factory clean and in a sterile condition, a boiler is indispensable.. This being so, and where wood is plentiful, a boiler and engine is cheaper and more durable and suitable for ordinary factory work than oil engines, electric motors, and gas heaters for heating water.

MR. HAMILTON'S REPORT.

His Tour of the District.

Interesting Address.

To the President and members of the Wellington Agricultural and Pastoral Society, Bunbury.

Gentlemen,—I have the honour to report that on 3rd July I received a letter from your secretary informing me that it was the wish of the committee of your society that I should go round on their behalf amongst the dairy farmers throughout the South-West district for the purpose of ascertaining the number of cows that are being milked in the district, and also what amount of support the farmers would be likely to give towards a co-operative butter factory in the event of one being started in Bunbury.

After due consideration I decided to undertake the work and do the best I could. I accordingly, in the interests of the movement, started my travels on Monday, 15th July, and since that I have, as opportunity offered, visited most of the dairy farms throughout the district. I regret to say that my movements have been greatly hampered and rendered somewhat unpleasant by rain, which has fallen almost every day since I started out.

In the course of my travels I have visited Roelands, Brunswick, Benger, Wokalup, Harvey, Uduc, North Harvey, Waterloo, Dardanup, Ferguson, Boyanup, Capel, Busselton, Stratham, Stirling, Brookhampton, and Coast-road districts.

There are one or two localities I have not yet visited, but I hope to do so before finally closing my investigations. I append herewith a list giving the names of the various farmers I have called upon, and the number of cows they milk during the year.

From this list you will notice that there are nearly 900 cows being milked within a radius of say, 35 miles of Bunbury, up till the end of December. You will also notice that several names are given, but no cows are set down opposite these names ; in these cases I have not called, or the owners have been away from home when I have called, and so the information is not available, but if these are taken into account it will probably be found that there are 1,000 cows in milk in this district up till the end of December. Of this number I think it will be quite safe to say that fully 800 will be available for factory purposes.

There are very few cows being milked in this district during summer time. My inquiries show that from December or January till, say, end of June, there are about 170 in milk ; of this number it would not be wise to rely on more than 150 for factory purposes. I have also made some inquiries concerning the average butter yield per cow, but I do not attach too much importance to this. I think an average yield of 4lbs. per cow for the season right through the district would be a fair one.

I also append a list showing those who are prepared to take shares in the proposed factory. Those whose names are typewritten had put their names down before I started out. From this list you will see that there are only 566 shares applied for. Of this number 361 are applied for by farmers.

I am disappointed that the farmers have not taken the matter up more enthusiastically. I feel that there is a great future here for the dairying industry, and no part of the State is so well suited for this particular industry as the South-West. With the railway opening to Narrogin, together with the local requirements of such places as the Collie, Greenbushes, etc., it seems to me that there is a splendid future ahead for a butter factory here, and surely the farmers, for the sake of a little capital, will not allow private firms to secure profits which might easily be diverted into their own pockets if they co-operate among themselves.

The dairying industry has been a languishing one for years past. There are many fine herds of cows throughout the district, but the industry does not appear to be carried out in a systematic manner. Very little provision is being made to provide feed in summer, and the old system of milking till Christmas time and then drying the cows off, still predominates in most parts. This state of things is owing to scarcity of natural feed, and the difficulty of making butter in hot weather.

Butter made by farmers in summer time is generally inferior to the imported article, and the price obtained for it does not compensate for the extra trouble of making it, and the cost of growing feed for cows.

At present the farmer has no difficulty in making and finding a ready market for first-class butter up till August or September, but after this, butter becomes very plentiful and the farmer has difficulty in finding a market, and as the warm weather sets in the difficulties of making good butter increase, and an article is almost invariably turned out that cannot compete with the factory-made butter from the Eastern States.

It is pleasing to note that the farmers are realising that the factory system overcomes most of these difficulties. Under this system he is relieved of the trouble of converting his cream into a marketable butter ; he is also relieved of the anxiety of finding a market for the butter when made ; and he is relieved of the vexatious bother of collecting his money after his butter is sold, which is very often the toughest part of the whole business.

In every place I visited I found the farmers in sympathy with the movement to start a co-operative butter factory, and in many cases I was told by farmers that they would go in for milking in summer time if a factory was started, but under present conditions it would not pay them to do so.

I find there are several reasons why the dairying industry has not made much headway of late years. Fruit growing, sheep farming, and chaff growing have been more profitable than that of the primitive methods of making butter on the farm, and the work incidental to these industries does not keep a man so closely tied down as dairying. It has also been both difficult and expensive to get suitable labour for milking ; but perhaps the factor which has done most to discourage dairying in these districts is the great increase of the disease known as the rickets. Of late years this complaint has increased alarmingly amongst the herds of the South-West, and in many instances farmers have given up cattle and gone in for sheep. The prevailing opinion is that the complaint is caused by stock eating the Zamia palm. This is unquestionably one cause, but there are probably other causes. The subject has never been thoroughly inquired into, and considering the vast amount of damage this complaint causes annually amongst the herds in the South-West, I think the Government should be induced to have the matter thoroughly investigated. Surely in this age of scientific research, when various forms of bacteria are found to play such an important part in most diseases, some remedy should be found for rickets.

I said just now that I found the farmers in sympathy with the movement to start a co-operative butter factory. In view of the fact that so few of them have decided to take shares in the concern, those of a critical turn of mind are apt to doubt the success of such a concern. There appears to be a feeling of unrest throughout the district. Seasons have been bad, crops have been low, and prices low.

A matter which is causing a good deal of uneasiness amongst farmers is the Health Act. In some instances inspectors from the Health Department have already visited farms in the district and informed the owners that they must cement the floors of their milking sheds and milk rooms. In many instances this would put the owners to very heavy expenditure, and in several places I visited farmers informed me that they could not carry out the requirements of the inspectors, and would have to turn out their cows and calves. I think the Health Act, so far as it applies to dairies, should be under the control of the Agricultural Department, and if necessary not enforced too stringently at the beginning.

In addition to all this, there have been so many companies floated which have proved failures. Some years back a factory was to be started in Perth. Many farmers in the district took shares in it, and paid calls, and nothing further was heard of the matter. Then there is about £1,200 belonging to the farmers around Capel and Busselton locked up in the Busselton factory. With all this staring the farmer in the face, it is little wonder that he should act cautiously.

I honestly think there is a good opening in this district for a butter factory. I am confident that if once started it would go on prospering. I am also quite convinced that it should be run on co-operative lines, and with sound economical management, it should, I think, prove a boon to farmers.

In view of the fact that there are so few cows milked here in the summer time, and also in view of the limited amount of capital likely to be raised, I think if it is decided to start the factory, the initial expenditure should be kept as low as possible. It would probably be found more expedient to rent a building for the first few years, and then as the business increases it may be found necessary to go in for larger quarters. I understand that a lease can be obtained at a very low figure of Beigel's old bottling works, a building which seems substantial and well constructed, and which could, doubtless, be fitted up as a factory. Several farmers have expressed the opinion that Picton or Dardanup would be a better site for a factory. The high price of land in Bunbury, and also the high municipal rates, are urged as an objection to the factory being in Bunbury. We should not, however, lose sight of the fact that Bunbury will be the chief market for the butter made, and the less we have to pay in freights the better, and it may also be found more economical to run the machinery by electricity than steam. I do not know if I am going too far outside my mission, but I think an effort should be made to induce the Government to give more substantial aid towards the establishment of a factory. The factory, when started, will have to compete with butter from the Eastern States, where the feed is superior, where the rainfall is more evenly distributed throughout the year, and where the butter industry has been bolstered up by Government aid in various forms for years past, until it is now able to compete successfully in the world's markets. Vast sums of public money have been spent in the encouragement of the industry in the Eastern States. We are told that New Zealand has spent £215,000 in this respect, Victoria has spent £300,000 in bonuses alone, besides large amounts in freezing works, salaries of experts, instructors, etc. ; New South Wales and Queensland have also spent large sums in establishing their butter industry. What are the Government doing here to start the industry ? They offered to lend £ for £ up to £1,000 at 4 per cent., three years' interest free, on condition that the farmers raise a similar amount. If this is the best offer the Government can make, I can only say that it is left for some future Administration to grasp the importance of the dairying industry to the State.

Many farmers have expressed the opinion that it would be a very good idea to hold a conference at Bunbury, or some other centre, at which matters affecting the farming interests could be discussed. It has also been suggested to me that the Premier and the Minister for Agriculture should be invited to be present, and that the whole question of the establishment of a butter factory should be discussed and placed on a solid footing.

The scheme inaugurated by the Hon. Minister for Agriculture to purchase cows in the Eastern States for distribution amongst farmers here on easy terms is likely to be of great benefit to dairymen. It is a move in the right direction, and even if some of the cows are not quite as good as we may wish, that is hardly sufficient reason for condemning the movement. It is reported that the cows have not been applied for as freely as was expected, but this should not discourage the Minister. The scheme has been sprung upon farmers so suddenly that many, though anxious to avail themselves of the offer, have not been able to make suitable arrangements to do so this season. I have no doubt from what I have seen, especially if factories start, that the Government will have a great many applications for cows next season.

In conclusion, sir, I cannot close without expressing my most sincere thanks to the farmers throughout the districts I visited. In every locality I was treated with the utmost hospitality and kindness. My trip was—in spite of the inclement weather which followed me everywhere—a most interesting one, and I shall never forget the kind hospitality of the dairy-farmers of the South-West.

I am particularly indebted to Mrs. Rose (Roelands), Messrs. G. C. Rose (Brunswick), Aubrey Smith (Harvey), J. Duce (Boyanup), J. L. Bentley (Capel), J. H. Forrest (Ludlow), G. Layman (Wonnerup), R. Gale (Busselton), M. Thomson (Brookhampton), and Mr. J. Conning, of the Busselton butter factory, who all gave me valuable assistance in their respective districts.

I also thank you, sir, and gentlemen, for the confidence you have reposed in me, in asking me to undertake such an important work. I hope, further, that my efforts will prove of some value in the direction of placing dairying under way in these districts.

COMMONWEALTH STATISTICS.

Average Market Value of Chief Descriptions of Stock.

Class of Stock.	Maximum.			Minimum.			Fair Average.		
	£	s.	d.	£	s.	d.	£	s.	d.
Horses—under 1 year	15	0	0	1	5	0	4	0	0
„ over 1 year	90	0	0	15	0	0	55	0	0
Dairy Cattle, in milk	27	0	0	13	0	0	17	0	0
„ dry	12	0	0	3	10	0	9	0	0
Other Cattle—under 1 year	5	0	0	0	15	0	2	0	0
„ over 1 year	20	0	0	3	0	0	7	0	0
Sheep—under 1 year	1	5	0	0	7	6	0	13	0
„ over 1 year	1	8	0	0	10	0	0	18	0
Goats—Angora	2	2	0	0	10	0	1	15	0
„ other	0	15	0	0	3	6	0	7	6
Camels	120	0	0	25	0	0	40	0	0
Mules	90	0	0	30	0	0	70	0	0
Donkeys	25	0	0	5	0	0	18	0	0
Pigs—under 1 year	3	3	0	0	10	0	1	5	0
„ over 1 year	7	10	0	0	15	0	3	0	0

Note.—The above prices do not include Stud Stock. The highest prices for light stallion, £1,200; draught stallion, £525; bulls, 300 guineas; rams, 400 guineas

FRUIT GROWING INDUSTRY.

COOL STORAGE AND PROFITABLE PRICES.

THE VICTORY OF THE REFRIGERATOR.

WHERE ORANGES THRIVE.

Inspector S. H. Whittaker, of the Perth District, under the Crown Lands Department, has forwarded the following quarterly report to the Under Secretary :—

"I had a chat the other day with Mr. J. Ward, of Kelmscott, on orchard prospects and what had been accomplished for this important industry by the cool storage system that has lately been largely availed of, and what he said will, I hope, be as interesting to others as it was to me. A practical man, he talks right to the heart of the subject and tells in a homely yet striking way some highly encouraging facts.

"Mr. Ward says that fruit fly would have been the most dreaded enemy of our orchardists, much worse than codlin moth, if growers had not found salvation as well as better prices and steady control of the market in cool storage. The fly some years ago was scarce : this year it would have been a scourge if it had not been found, just in time, that the ice-house not only killed the pest and saved the fruit, but also, by preventing glut, greatly enhanced the selling value of the fruit. It was discovered by actual test that newly punctured fruit, if stored in the refrigerator, had the larvæ killed before it could do mischief or impair the quality of the crop, and it was ripening in the ice chamber nearly as well as it would do in the sunshine on its native branch. He had seen dead and shrivelled embryo pests in fruit that came out of the cool warehouses practically as good as if the apples or pears had never been attacked. The ice-house was the only wholesale fly antidote he knew of, but he had used kerosene traps successfully before the autumn rains set in. Kerosene, it seemed, was only attractive to the fly in dry weather. He captured between 500 and 600 flies in his fifty pots while the warm season lasted, then a moist atmosphere left the traps empty while oranges continued to be attacked.

"But apart from the fly, cold storage was for the present at any rate the cure for congested markets and low prices. He had seen nectarines taken out of the Perth chambers in first-class condition after three months storage, and sold at a price that made the growers smile. Pears after six weeks in ice, or next to it, rose from 4s. 6d. to 12s. 6d. and 14s. per case, and apples at least doubled their value.

"The fruit men were mostly blind to cool storage until this season, especially to its double advantages of smothering fly in its innocuous stage, and raising returns, but they were no longer dense on these points, especially as charges were reasonable and the refrigerators reliable. What a special boon cool storage was to non-export varieties which came in too plentifully all at once if no steps were taken to preserve them. Now that apples could be sold all the year round, instead of for only a few weeks, the natural cropping season, even less than prime sorts were saleable at a profit by waiting a little while and feeding the market gradually.

"Apples ripened in the cool chambers. It was fortunate that the fruit could be taken green from the trees and allowed to mature in the city. This was the prelude, he hoped, to the extirpation of the fly. To combat the foe as effectively without the aid of cold storage, all the immature punctured fruit would have to be destroyed. The refrigerating houses on the other hand, in some cases increased its value four-fold—that is reckoning the difference between green and ripened fruit and a bare or glutted market. Happily the fruit fly, which made its appearance, generally speaking, in February, did not make its ravages severely felt until March, by which time the early crop was forward enough to gather and consign to the cool stores.

"It was time the fly was wiped out, for apart from cool storage it had so far had all the best of the fight. This season was the first he had known it to come at apricots, and apples had never had such a doing. The keen competent market inspectors of the Agricultural Department had been very vigilant. He himself had had fruit condemned by these inspectors even after it had been sold. They had followed it up like a pointer on quail till by turning over a whole case they had tracked a fly in an apple. He did not object to this sharp-sighted zeal : it was better for him and every fruit grower in the long run. He had frequented the markets a great deal as he used to keep a shop in Subiaco, and he therefore knew the zest and ability of the insect inspector staff.

"Dunn's Seedling was one of the sorts in which the fly throve best and matured with the greatest rapidity, but the Seedling and Rome Beauty were two of the best varieties to ripen in cool storage, when plucked in March. The later kinds like, Rokewood and Rymer, were not fit for pulling in March, but being hardier apples about 50 per cent. of the larvæ of the flies that struck them died in the cell. Seventy-five per cent. of affected apples could be saved by cool storage. There were no flies about between September and January.

"The life history of the fly was simple and known to every orchardist. But if there was anyone outside the business who cared to know its mischievous habits he could say, without having any scientific knowledge, that the fly probed a tiny orifice in the fruit and deposited what, after a day or two, could be discerned as a tiny maggot. The maggot grew rapidly until about 14 days after the puncture was made it was about a third of an inch in length, and cream coloured. Next the maggot developed into what he would call (not in the language of an expert) a brown elongated crystal, which passed through the now rotten and enlarged puncture into the ground if the fruit had not been picked, or alongside it wherever it was packed. The 'crystals' apparently lay dormant till about January, when a fresh generation of flies emerged from them. The infected part of the fruit vacated by the 'crystal' gradually enlarged until finally the whole interior became rotten pulp. The fly took to pears as first choice. Until last year the increase of the pest was spasmodic ; then it came with a myriad rush, and no district wholly escaped.

"The outlook of the fruit grower was all right for the present, with cool storage even for the man who had not planted with an eye to export. Those who had the best export sorts—and only experience would fix them—

were on velvet. While non-export sorts might in time be a little over supplied, new orchards to any extent could still be profitably planted for the old world markets, which were practically illimitable, seeing that Western Australia could put its apple crop there before any of the Eastern States or Tasmania, and could grow first-class apples. It was all a question of planting only half-a-dozen of the right kinds, the fewer the better, perhaps, supposing the winning kinds were struck in making the choice. He had his own preferences as to which were the best kinds for export, but it was not for him to get on a tutor's pedestal. He would leave that to the expert staff of the Agricultural Department.

"As for oranges, he thought an orangery on the true site was the prize of fruit growing, because there was comparatively little land that was really adapted for oranges. While the best oranges would be good for export, he believed they would be good enough to keep at home because we were not likely to have any first-class oranges to spare. There were many soil conditions for successful orange growing that did not attach to any other plantation.

"Touching Mr. Ward's reference to orange growing country I may add, from a wide knowledge of Western Australia, that there is no belt in the State so intersected with orangery locations of the choicest kind awaiting development as the Upper Murray country, that is, the territory south of the river Murray and between Waroona and Yarloop on the South-Western railway line. There are roads already made to these highly-favoured spots, through which springs and pellucid permanent brooks run, in the shape of the abandoned railway tracks of Millars' Combine, which has cut out the surrounding forest of jarrah timber. The only drawback to the transport facilities of this eligible fruit region is that the main road *has been gated,* near Waroona, lately, after the road had been an open main road for 15 years, and the settlers, with one exception, are in open rebellion and resolved to defeat this grave trespass on their right of the free access to their holdings under which they acquired their homes. With departmental permission I should be glad to act as guide to those looking for real orange land and show them orange plantations thriving in perfection in the fertile Upper Murray district."

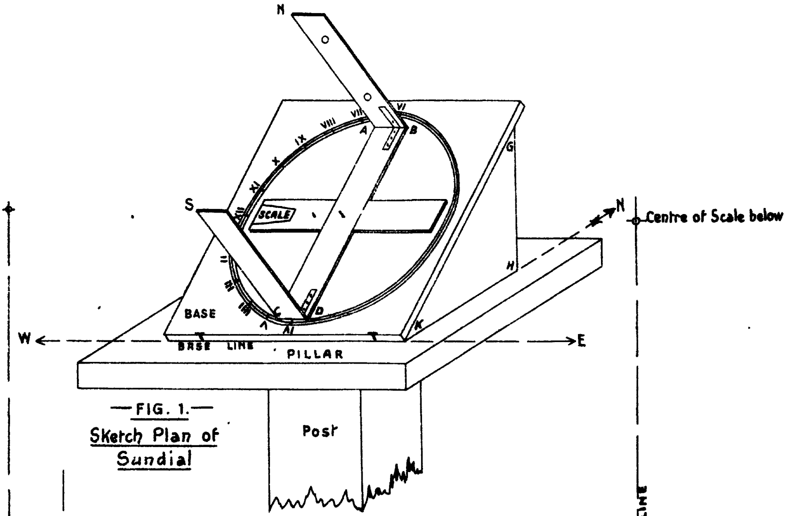
THE NEW SUN-DIAL OR HELIO-CHRONOMETER.

By W. E. Cooke, Government Astronomer.

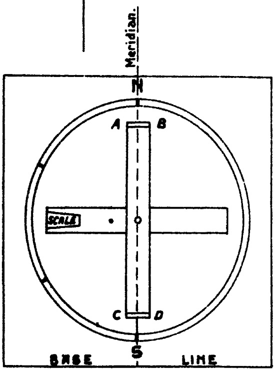
The new form of sun-dial can easily be made by any amateur carpenter, and with even rough workmanship may be depended upon to give correct time within a minute or two. Moreover, the standard time of the State is read off directly from the dial without any subsidiary corrections.

The following instructions are for a 20-inch instrument with a graduated circle of about 10½ inches radius. The diagrams are not drawn to scale.

Fig. 1 gives a general view of the mounting. A distinction, for purposes of description, is made between the pillar and the base. The former

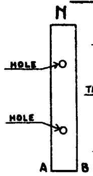


— FIG. 1. —
Sketch Plan of Sundial

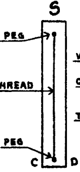


— FIG. 2. —

-Uprights-



— FIG. 3. —



— FIG. 4. —

— Pointer Arm. —

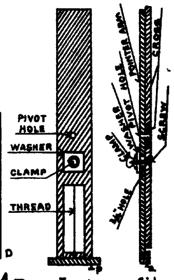
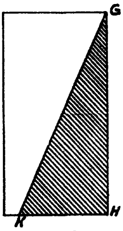
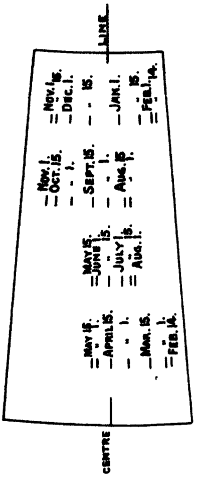


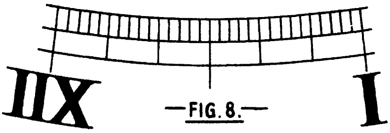
FIG. 5.



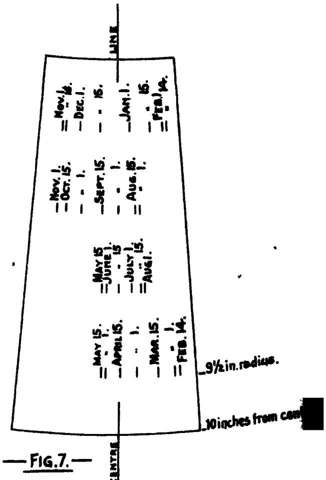
— FIG. 6. —



— FIG. 7. —
(DUPLICATE SCALE)



— FIG. 8. —
Subdivision of Hour.
10¾ inch radius.



— FIG. 7. —
SCALE (FULL SIZE)
for 21½ inch Dial.

H J Pether, Government Lithographer, Perth W A

consists of a fairly substantial block of wood, 24 x 18 inches minimum measurement, fixed to the top of a stout post and levelled as well as possible. The longer side should run approximately east and west.

The *base* is a smooth piece of slate or other material about 2 feet square. Slate is undoubtedly the best, but where this is not easily procurable a flat piece of galvanised iron backed with wood is almost equally good. Some little care should be taken to make the base line straight and quite level when in its true east and west position.

The Circle.—Unlike the ordinary sun-dial, the divisions are equidistant, and therefore are easily made. Draw a straight line at right angles to the base line, cutting the circle in two points, S. and N. (Fig. 2). With the dividers opened exactly as they were for drawing the circle, place one point at S. and step round the circumference; three equal steps will carry us exactly to N. and three more will bring us back to S. Now bisect the three spaces on the western side (left-hand), and again bisect the six thus obtained. This gives us 12 divisions of one hour each. Mark the middle one XII, and the others I, II, etc., in succession down to S., which will be VI p.m.; also XI, X, etc., in succession up to N., which will be VI a.m. Each hour should then be subdivided into 30 spaces of two minutes each, and for this purpose the scale (Fig. 8) will assist.

The Cross.—This may be made from a piece of 6 x ½ matchboard 20 inches long. Trim off the edges and cut it lengthwise down the centre. Then plane up the two pieces and halve them into one another to form a cross. Cut out the scale (Fig. 7) and glue or tack it on to the extreme end of one arm of the cross, as shown in Fig. 2. Be very careful to see that the centre line of the scale, if produced, passes through the centre of the cross. This is most important. Make a small hole through the centre to fit a stout nail or screw which has been driven into the middle of the base to form a pivot, and from which the head has been filed away. This pivot must project at least one inch, because not only the cross but also the movable pointer shown in Fig. 5 has to swing on it.

The Uprights.—These are shown in Figs. 3 and 4. They are made of the same material as the cross, their dimensions being 13 x 3 x ½. They are attached to the cross at AB and CD respectively (Figs. 1 and 2) by means of 6-inch galvanised shelf brackets. These should not be screwed down the middle, but on one side, as shown, leaving the middle line of each upright quite free. If there is the least sign of want of rigidity use two brackets for each upright.

Now comes the most delicate task of all, viz. marking the centre line on one and the holes on the other of the uprights. The accuracy of the instrument depends almost entirely upon this. It only requires a little care, and presents no real difficulty whatever. Place the base flat on a table at one end of a room, in a good light, and make it as level as possible. Put the cross on the centre pivot with the north end facing down the room. Remove the North upright by carefully unscrewing one arm at the bracket. Place a heavy weight on the cross arms to prevent the cross from moving. Now take a plumb bob, or any rather heavy weight attached to a piece of strong thread or very fine string, go to the far end of the room and take up a position with one eye in line with the meridian line of the cross and the head resting against the wall. Hold the plumb line in front of the eye at arm's length (keeping the other eye closed). See that the weight is not touching anything and bring the thread *exactly* in line with the pivot in the centre of the cross. When it is quite steady ask an assistant to place the point of a lead pencil on the south upright near the bottom, and to slowly move it until it is exactly behind the thread; then to make a mark. Do the same near the top of the upright. Also make a mark in the table, as far in front of the cross as possible, by sticking in a pin exactly in the line of sight. Next replace the north upright, taking care not to disturb the cross, and go back once more to the wall. You will be able to look over the top of the north upright and see the top mark, just made, on the south one. Hold your thread in line with this mark and with the pin in the table, and place two marks in line on the front face of the north upright, one at the top and the other at the bottom.

On the south upright bore a small hole at each spot marked; stretch a black thread from one to the other and plug tightly. On the north upright draw a pencil line down the centre from one mark to the other and measure up distances of 3 and 9 inches respectively from the base. These are the spots where the pin holes are to be made. Before making the holes, bore two large holes (say half inch) nearly through from the inside, so as to leave only a shell, and then make the small hole from the outside, exactly at the spot marked, using for preference a red-hot piece of wire in place of a gimlet, as this makes a cleaner hole. Practise first on a spare piece of wood.

The Pointer Arm (Fig. 5).—Make this also of 3 x ½, 20 inches long, with a hole through the centre to fit over the pivot on the base. Cut out one end as shown to a distance of 3½ inches and tack on a thin piece of wood, which should project below so as to nearly touch the base when in proper position. Stretch a black thread across the middle of the opening on the under side of the wood and in line with the centre. At about 2¼ inches from the centre cut a hole ⅝ or ¾ inch in diameter. Now, going back to the cross once more, place the pointer arm in its proper position on the cross arm, with the thread covering the centre line of the scale, and mark a spot at the centre of the hole just made. Put a stout 2-inch screw through the arm of the cross at this spot, *from beneath*, so that the screw is pointing upward. Cut off a small piece (say an inch) of stiff wire, hammer it into the slit of the screw-head, and countersink the head into the bottom of the cross arm, so that the screw will be immovable. Place the pointer arm again in position, put a large stiff washer of any sort over the projecting screw, covering the ¾-inch hole also; take a piece of wood such as the end of a broom-stick, bore a gimlet hole in it and work it down on the screw point until it reaches the washer, thus clamping the pointer arm to the cross. Once again set this movable arm so that the thread just covers the central line of the scale (which passes exactly through June 15), clamp tightly and place on pivot of base. Rotate the cross until the central line which passes through the two holes of the North upright is exactly opposite the figure VI. The pointer arm will now be approximately opposite the figure XII. We have now to insert the little pointer P (Fig. 5), which may be either a small pin, or simply a mark made on the end piece of the arm. Subtract your local longitude, expressed in hours and minutes, from 8h. and place the pointer this much ahead of XII. Thus, for Perth it has to be placed a little past 12h. 16m. For Coolgardie, whose longitude is 8h. 04m. 40s., it must be placed nearly five minutes *before* XII. If a pin is used it should be placed as close to the base as possible.

It will probably be found necessary to trim a little off the end of the cross arm in order that the pointer arm may work freely.

Mounting the Base.—The base line must be level (important), and lie exactly east and west, and the base must be tilted up at an angle equal to the observer's colatitude (as in Fig. 1). The first (level) is easily obtained. Leave the second (E. and W.) for a moment. As to the third (tilt), see Fig. 6. Square up a piece of wood, and from one corner (G) lay off an angle (B) equal to the latitude. If a protractor is not available proceed as follows. Let GH be exactly 6 inches. On HK, which must be at right angles to GH, lay off the following length according to latitude, viz.:—

Latitude	28	degrees	3·19	inches	($3\frac{3}{16}$	inches)
Do	29	„	3·32	„	($3\frac{5}{16}$	„)
Do	30	„	3·46	„	($3\frac{1}{2}$	„ bare)
Do	31	„	3·60	„	($3\frac{5}{8}$	„)
Do	32	„	3·75	„	($3\frac{3}{4}$	„)
Do	33	„	3·90	„	($3\frac{7}{8}$	„)
Do	34	„	4·05	„	($4\frac{1}{16}$	„)
Do	35	„	4·20	„	($4\frac{3}{16}$	„)

Then cut from G to K, and the angle GKH gives the correct angle of elevation.

Set the instrument up with the base line as nearly east and west as possible, leaving the final adjustment for a moment, and learn how—

To read the instrument.—First set the pointer arm so that the thread corresponds to the correct date on the scale. Then turn the cross until the N. end faces the sun, when a small dot of light will be seen on the south upright. Rotate carefully until this spot is exactly bisected by the thread of the south upright, and the pointer will then indicate the true standard time of the State, without any subsidiary corrections.

Final Adjustment.—To place the base line exactly east and west (very important). For this purpose you must start with correct standard time, which may be obtained from any convenient railway or telegraph office. Choose a nice clear day. Set the pointer arm at the correct date, clamp it, and rotate the cross so that the pointer is exactly opposite XII. A few minutes before noon commence to follow the dot on the S. upright, keeping it on the thread by *twisting the whole instrument,* base and all, upon the top of the pillar, and stop at exactly 12 o'clock, correct time. Everything will now be properly adjusted, but as a check you should move the cross to point to four minutes past 12 and see if the spot of light is on the thread at the right moment. Finally, drive in two nails or screws to keep the base line in its proper position.

You have now a time-piece which will never go wrong, requires no winding, and can be depended upon to give the correct standard time to within a minute whenever the sun shines. This error, however, may be slightly increased by refraction when the sun is near the horizon. The best time to compare your clock is of course somewhere near midday, when any error due to incorrect elevation will not be noticeable.

The cross and pointer arm should not be exposed to the weather, but kept inside, and placed on the pivot when required. For the pivot itself a brass screw is preferable, with the head filed off.

It will be found advantageous to glue or tack small strips of leather here and there on the underside of the cross.

An instrument of this description has been made and mounted at the Observatory, and may be inspected by any applicant; and I shall be pleased to answer any questions or supply any additional information that may be required.

The scale (Fig. 7) has been given in duplicate so that one may be cut off and placed on one of Fig. 2.

AN INTERESTING RELIC.

Average Prices of Wheat.

As Registered at Eton College, from 1646 to 1830 inclusive.

Years.	Mean price of the year.		Years.	Mean price of the year.		Years.	Mean price of the year.	
	s.	d.		s.	d.		s.	d.
1646	49	2	1684	39	1¼	1722	32	0
1647	65	5¾	1685	41	5¾	1723	30	9¼
1648	75	6½	1686	30	2½	1724	32	10½
1649	71	1¼	1687	31	8½	1725	43	1¼
1650	68	1¾	1688	23	1¼	1726	40	10¾
1651	61	0½	1689	26	8	1727	37	4
1652	43	10¼	1690	30	9¾	1728	48	3½
1653	31	4¾	1691	29	11	1729	42	2½
1654	23	1¼	1692	41	9¾	1730	32	5¼
1655	29	7½	1693	60	1¾	1731	29	4
1656	38	2½	1694	56	10½	1732	23	8¼
1657	41	5¾	1695	47	1¼	1733	25	2¼
1658	57	9¼	1696	56	0	1734	33	5¾
1659	58	8	1697	53	3½	1735	33	2¾
1660	51	3	1698	60	8¼	1736	35	10¼
1661	62	2½	1699	56	0	1737	33	8¾
1662	65	9¼	1700	35	6½	1738	31	6¾
1663	50	8	1701	31	8¼	1739	33	2¼
1664	48	0	1702	26	0¾	1740	48	10½
1665	43	10¼	1703	32	0	1741	41	9¼
1666	32	0	1704	41	2¼	1742	28	5¼
1667	32	0	1705	26	8	1743	22	1¾
1668	35	6½	1706	28	8¾	1744	22	0¾
1669	40	0	1707	25	2	1745	24	8½
1670	37	0½	1708	37	8½	1746	34	8
1671	37	4	1709	69	7½	1747	30	11½
1672	37	0½	1710	69	4	1748	32	10½
1673	41	5¼	1711	48	0	1749	32	10½
1674	61	0½	1712	41	2	1750	28	10¼
1675	52	1¾	1713	45	4	1751	34	2¼
1676	33	9¼	1714	44	8	1752	40	8¾
1677	37	4	1715	38	2¾	1753	39	8¼
1678	52	5¼	1716	42	8	1754	30	9¾
1679	48	0	1717	40	5	1755	28	11
1680	40	0	1718	34	2	1756	40	2½
1681	41	5¾	1719	31	0¼	1757	53	4
1682	39	1¼	1720	32	10½	1758	44	5¼
1683	35	6½	1721	33	4	1759	35	8

Average Prices of Wheat—*continued.*

Years.	Mean price of the year.		Years.	Mean price of the year.		Years.	Mean price of the year.	
	s.	d.		s.	d.		s.	d.
1760	32	5¼	1784	53	9¼	1808	83	9
1761	26	10½	1785	48	0	1809	106	0
1762	34	8	1786	42	2½	1810	112	0
1763	36	1¾	1787	45	9¼	1811	108	0
1764	41	6½	1788	49	4	1812	128	0
1765	48	0	1789	56	1¾	1813	120	0
1766	43	1¼	1790	56	2¼	1814	85	0
1767	57	4	1791	49	4	1815	76	0
1768	53	9¼	1792	47	1¼	1816	82	0
1769	40	8	1793	54	9¾	1817	116	0
1770	43	6¾	1794	54	0	1818	98	0
1771	50	8	1795	81	6	1819	78	0
1772	58	8¼	1796	80	3	1820	76	0
1773	59	1¼	1797	62	0	1821	71	0
1774	55	1½	1798	54	0	1822	53	0
1775	53	10	1799	75	8	1823	57	0
1776	42	8	1800	127	0	1824	72	0
1777	48	10	1801	128	6	1825	84	0
1778	44	0	1802	67	3	1826	73	0
1779	36	2¾	1803	60	0	1827	65	4
1780	43	1¼	1804	69	6	1828	82	4
1781	52	5¼	1805	88	0	1829	78	8
1782	53	9¼	1806	83	0	1830	77	0
1783	54	2½	1807	78	0			

STACK SILOS.

By A. Despeissis.

The stock-carrying capacity of the land is measured by the amount of fodder it can be made to produce.

Fodder, unless fed or preserved when it has reached that stage when it contains its maximum of nutriment soon undergoes transformations, and is practically lost for feeding purposes.

The axiom that "stock must follow the plough" is becoming a golden rule that few will deny. Practical experience in this direction is afforded wherever settlement takes place.

Wheat and oats converted into hay by sun-drying and then chaffed will always stand the most economical way of conserving and concentrating for stock feed, crops which are grown to be subsequently sold off the farm and trucked to distant markets.

The same crops lend themselves even more readily to curing into silage, and in that form prove more palatable, while their nutritive properties are not impaired. Much indigestible fibre besides, is, during the curing process, softened and rendered more digestible.

The types of silos which have been used are numerous, and comprise pits, towers, and stacks.

These differ in shape, and in their construction, a variety of material such as earth, stone, bricks, cement, concrete, iron, wood, asbestos paste have at one time or other been used and recommended. The material employed does not influence the result, and good as well as bad or indifferent silage is turned out whichever method is followed.

In connection with stack silos, it is objected that a greater proportion of waste results than is the case with closed silos. This waste, however, can, to a notable extent, be reduced by careful packing, and by cutting the crop when still succulent and before it is too ripe ; also by firmly treading down the sides, and by applying an even and sufficient pressure to keep the mass compressed during the period of storing.

Stack silos, on the other hand, present this advantage over other silos which must necessarily be fixtures, in that they may be erected anywhere, and when put up on the site where the crop is raised they obviate the necessity of much unnecessary carting.

This consideration, viewed in the light of a saving against the greater proportion of waste resulting from stack silos is by a great many considered as a sufficient set-off to recommend its adoption in a number of cases. Another important point in their favour is their cheapness as compared with any kind of permanent structures.

The following directions bearing on the subject of building a stack silo may serve as a guide as to how to proceed :—

Site.—Select a level piece of ground where to erect the silo. The land must be above reach of storm waters ; it is advisable to dig a ditch around it. The stack should be central and of convenient access to stock.

Crops.—Any kind of green crop will cure into ensilage, but it is obvious that the more nutritious fodder makes the more nourishing silage. Lupins, weeds, and any kind of rank herbage will be made palatable, and will, when thus treated, be eaten by stock, but it is obvious that crops with a higher feeding value must make the best silage.

The following crops lend themselves to ensilage :—Wheat, especially if by accident it becomes unsuitable for hay or grain. A frost-bitten crop with light ears turning yellow prematurely, or a rank crop threatening to become rusty, can be thus turned to good account. Other cereals, such as oats, barley, rye, also maize, sorghum, millet, make good silage. If mixed with some leguminous crops such as peas or vetches they are better still.

When to cut.—When the ear shows, and after blossoming, but before the grain shows a glaze, the crop is at its best, being succulent and richest in nutriment. In dry districts the crop should be carted at once to the silo and as much as can be handled during the day is cut at a time.

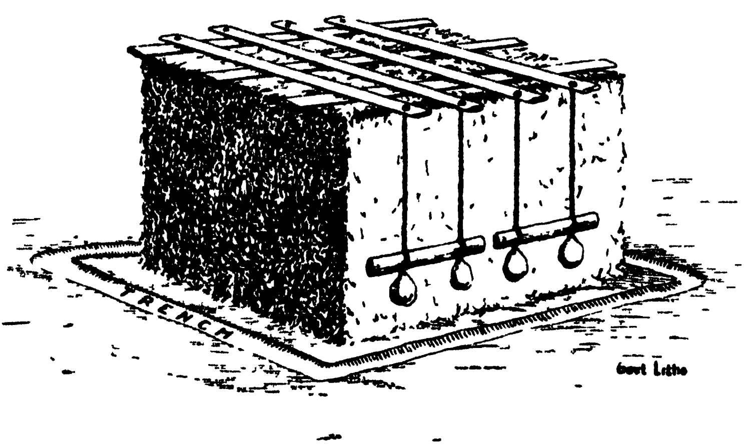
The stack can be built in wet as well as in fine weather.

It is obvious that on account of its succulent nature a silo, unlike a stack of hay, is safer against fire, and for that reason saves the usual insurance premium.

Size is governed by the extent of crop available, by the number of head of stock to feed, and by the length of time one may have to feed them.

Fairly well compressed silage weighs 45lbs. per cubic foot, or in other words 50 cubic feet of silage weighs one ton.

Thus a square stack silo properly settled, measuring 20ft. x 20 ft. and 13ft. to the eaves, would contain 5,200 cubic feet or 104 tons. Of this about 12 per cent. would represent the wastage due to decomposition on the exposed surface. The settling of green succulent stuff is often considerable, and for that reason the stack should be built to a good height. For that purpose a hoist may be rigged up alongside the structure, or else the sheaves are forked from the dray to a platform when the height reaches 10ft. to 12ft., and then to the top. The square shape is one which allows the greatest amount of dead weight being exerted by the material itself. The higher the silo the lighter the weight necessary to place upon it.



Stack Silo, weighted with bags of sand or stone.

If a circular stack silo is put up, it is best to build it inside a circle of uprights or saplings tied together by means of fencing wire.

If it can be located under a high tree so much the better. A pulley attached at a height of 25 feet or so will be found useful for hoisting the top layers of the fodder and the earth or other material to be placed on top.

Building.—Some place a sapling at each corner in order to prevent the stack leaning over, but where the stack is given a wide base this is not necessary. The sheaves are placed with cut ends of the stack outwards, so as to make the stack as solid as possible outside. In the body of the stack the sheaves, with strings cut, are placed anyhow. In building, the edge should be kept slightly higher than the centre, which is generally better trampled down and more compact.

The sides and ends should be kept plumb. A flat top is susceptible of being better weighted. To transverse saplings o· suitable timber, the ends of which reach over the edges, are fastened wires, on which are hung heavy timber or bags of soil. Underneath these two cross saplings, one on each edge of the ends, distribute the pressure evenly along the length of the stack.

That arrangement is shown in the illustration attached. These saplings also prevent the wind blowing the stuff about when the stack is erected, the face is cut and trimmed with the hay knife.

Subsiding.—This is gradual, and a shrinkage of one-half to two-thirds the height is effected without much extra weighting.

Sour and Sweet Silage.—As soon as green stuff is cut it begins to undergo certain changes. Of course, it loses water, but if it is gathered quickly, or put into the silo at once the loss is not very great. Then important changes, both physical and chemical, set in. The mass heats, the volume shrinks, the colour turns darker, the taste becomes more palatable. A smell is noticed which is sharp and unpleasant in sour silage, and sweet and fragrant like cured tobacco in sweet silage ; the fibres soften and become more digestible.

The main cause of these changes is due to the presence of innumerable micro-organisms, which generate changes akin to those which take place during the course of wine fermentation. During fermentation heat is evolved, to a greater or lesser degree, according to the access of air to the green stuff in the process of curing. Great pressure, excluding air from the mass, reduces the oxidation and keeps the temperature moderately high, *i.e.*, from 100 to 120 degrees F., and *sour* silage is produced. When on the other hand more air penetrates the mass, on account of either its coarseness, its greater degree of maturity, or the lesser pressure it is subjected to, *sweet* silage results, the temperature reaching 130 to 150 degrees F.

Above that temperature excessive combustion and resultant waste of feeding material takes place, the stuff turning dark.

Ration.—Roughly speaking the daily amount of silage necessary for stock amounts to 4 to 5 per cent. of the live weight of the animal in store condition.

Dairy cows, or animals which, on account of the work they perform, require rather richer food than dry cattle or sheep, should, besides, receive a few pounds of concentrated food, such as bran, pollard, oats, oilcake, etc. Thus a 1,000lbs. cow should receive 40 to 50lbs. of silage, while a smaller cow weighing 600lbs. would do well on 24 to 30lbs. with concentrated food added. For a 60lb. ewe, a suitable ration of wheat, barley, oats, or rye ensilage, would be 3lbs., and a sheep weighing 1cwt. should receive about 5lbs. a day, or less if running in a paddock offering some picking. An amount sufficient for the day only is removed at a time, and silage which has been exposed several days to the air should not be given to stock as it sometimes, when exposed to the air, turns mouldy and spoils. A depth of two to three inches should be removed every day.

As soon as the stack has been erected, a fence should be erected to enclose it, and keep out any stock depastured in the paddock.

ANALYSIS OF SOILS FROM MT. BARKER.

During a recent visit made by the Under Secretary of Agriculture to the Mt. Barker district, several samples of the soil were obtained from various locations, which were forwarded to the Government Analyst to report upon. The district being a good one for the cultivation of apples, especially when grown for export, a knowledge of the soil analysis must prove of value to those interested. The samples submitted were taken from the following places :—

No. 1.—Location 363, Wattle Hill, Porongorup. Wattle and karri timber, good black soil, grass grows well, also good crops of potatoes.

No. 2.—Location 907, Plantagenet, Porongorup. Redgum, jarrah and karri timbers, bracken, soil, deep friable loam.

No. 3.—Location 633, Dunn's Farm, Porongorup. Timber and soil same as No. 2.

No. 4.—Location 1143, Porongorup. Timber—Red gum, jarrah, karri, yates and hazelwood. Soil, dark friable loam.

No. 5.—Location 13, Hay River. Rushes, ti-trees, red gums and jarrah, few palms. Soil, red friable loam.

Mr. Mann having made an analysis of the above, reported on them as follows :—

Analysis of Soils from Mount Barker District.

	1		2		3		4		5		
	Total.	Available	Total.	Available.	Total.	Available	Total.	Available.	Total.	Available	Required.
Phosphoric Acid	·118	0671	·024	·0129	043	·0095	·036	·0205	·042	0087	·15
Potash	·285	·0156	·024	0099	·024	0110	·039	·0077	·015	·0085	·2
Lime	·559		·226		·160		289		040		·4
Nitrogen	·490		·311		·171		·342		·154		·25
Chlorine	·008		·013		·011		008		·009		.

"Total" represents percentage soluble in strong acid.

"Available" represents percentage soluble in one per cent. citric acid in seven days (Dyer).

"Required" represents a standard of total constituents for first-class soils, based on general experience, but to be considered only as a tentative standard to be used as a rough guide. The "available" constituents should be roughly one-tenth of those shown in this column.

Fertiliser Requirements and Remarks.—

1. All the soils are rather high in chlorine and should be well drained.
2. Nos. 3 and 5 would be improved by phosphatic and potassic manuring, and No. 5 by addition of lime.
3. Generally speaking, the soils appear to be of good quality but will require replenishing by phosphates and potash except No. 1, which seems to be very rich.

A NEW FODDER PLANT.

PHALARIS COMMUTATA (Canary Grass).

Our sketch shows a new fodder plant, *Phalarus Commutata* (Canary Grass), grown by Mr. John Furphy, jun., Neerim East, Victoria. The plants set out in poor, cold, grey soil. The large plant (fig. 1) shows the growth from the end of April last year to the end of January, when it reached a height of 7ft. Fig. 2 shows a growth of 46 days, when it reached 41in.

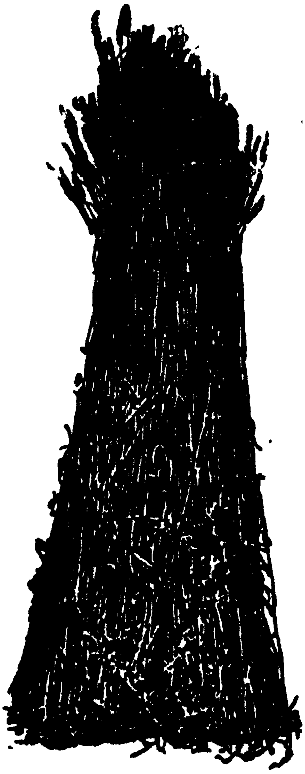


Fig. 1.—*Phalaris Commutata*, height, 7ft.

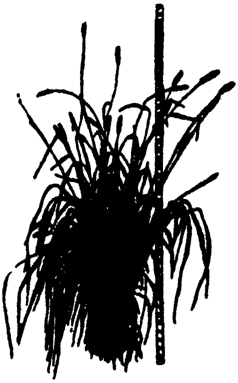


Fig. 2.—*Phalaris Commutata*, 41in. growth after cutting for seed.

New grasses, like new varieties of fruits, are constantly being introduced on to the market, but few of them ever fulfil the expectations formed of them, and fall a long way short of the standard accorded them by advertisers. Phalaris commutata, a grass which has lately given rise to a good deal of interest, and has been extensively boomed, is a variety which seems to possess many characteristics which should commend themselves to stockraisers, and in appearance is a grass which seems to justify the glowing descriptions generally given of it. If the sample grown by Mr. J. Furphy, of Hill End, Moe, represents the usual growth under ordinary conditions, then undoubtedly this canary grass will be a valuable acquisition to our fodder crops. The sheaf of hay shown by him, which he says represents the growth of one root, was a perfect sample of hay—juicy, of good colour, and sweet to the smell. It certainly looks a hay that should be relished by all kinds of stock. Phalaris commutata is a native of Italy. It was introduced into Queensland in 1884 by Mr. Harding, the curator of the Toowoomba gardens, being one of the many varieties of grasses obtained by him from the Department of Agriculture, America. What he says of it appears to have been borne out by all others who have tried the seed. "The seeds," he said, "were sown in drills, and all germinated and made good growth until the first frosts, which killed all except one, Phalaris commutata. Requiring the ground space for other purposes, I removed this grass, and simply dumped it into a corner of the nursery, taking no particular care of it. Although the ground was very hard, it made tremendous growth in one year, germinated where it had fallen, and in twelve months grew into clumps 2ft. across and 5ft. in height, with nice, soft, succulent blades, and flowering stems. This has been cut two or three times in the year. The roots are fibrous, and the foliage very dense, and a bright green in colour, especially during the winter. In appearance, the leaf is similar to that of P. Canariensis, but the plant is much more productive. Visitors from all parts of the Commonwealth, who were shown this grass, were surprised how it stood the drought. To graziers and dairymen I particularly recommend it, being particularly productive throughout the year. It is easily propagated, and when once started, it will soon produce seed which, if allowed to shed, will germinate freely. The seed is small and glossy. During the '93 drought some roots were in a bag for six weeks, and the only difference it made was that the foliage was slightly yellow, though the plants kept growing all the time. It seems to like all kinds of weather, and from the rapidity of its growth it excels all other grasses I have had anything to do with. What it would be if properly cultivated it is hard to say, but it is a very desirable grass to introduce and distribute. By its own self-sowing, it has covered a large amount of space in the nursery."

How to plant it.

Mr. Furphy, whose experience of the grass corresponds with that given by the Queensland botanist, states that his trials have been made on poor, light soil, and he estimates that if properly attended to and given a light dressing of superphosphate, it would yield 8 tons of dried hay to the acre per annum. These are very big figures, and the grower who got half that return should be well satisfied that he has found a valuable new fodder plant. "I obtained," he said, "a few plants, and transplanted at the end of April, and whilst putting them out in drills 3ft. apart and 2ft. in the drills, by the end of June they had made a growth of 2ft., sending on the shoots, until by the end of the season, as many as 167 seed-stems had been produced by one plant, the height being about an average of 7ft. It was a severe winter, but not a yellow leaf could be seen." He suggests that the seed should be sown in a bed like cabbage-seeds, and when the plants are sufficiently strong, should be transplanted 3ft. apart each way. Having only seen the grass in a sheaf, it is difficult to form an opinion of what it would be like for fodder purposes, but there can be no question that for hay it is admirably suited,

and if it fulfils half the good things claimed for it by the grower, Australian farmers should be well pleased.

The blocks have been kindly lent by Messrs. Law, Somner and Co., of Melbourne, who are prepared to supply seed, particulars of which may be obtained from their local agent, Messrs. A. J. Tijou, agents, Fremantle.

WEST AUSTRALIAN FRUIT IN LONDON.

The Agent General for Western Australia has forwarded reports from Messrs. Churchouse & Co., and Messrs. Keeling & Hunt, on Raisins and Fruit sent to London from this State.

Messrs. Churchouse & Co.'s report on the Raisins is as follows :—

"The Raisins are of good colour, well dried, and fairly packed. The flavour is also good. Some of the individual berries are deficient in bloom, probably due to the grapes not being quite ripe, and the bunches might, with advantage, be kept more separate.

"Although anything in the nature of false packing is to be deprecated, yet the public like the eye to be pleased, and for this reason a certain amount of 'facing' of the bunches with larger fruit is permissible.

"As to value, the fruit, in its present state, could never be more than a sixpenny article (per pound retail), and would, therefore, have to be sold on the market at about 40s. per cwt., duty paid. If 'faced' it would fetch 50s. or 60s.

"It should be packed in trays of 5½lbs. net. or in boxes of 4 layer, 22lbs. net. The layers should be lined with fancy gold lace or coloured papers."

Messrs. Keeling & Hunt's report on Fruit as follows :—

"In accordance with your request we have inspected the Fruit consigned per "Orontes," and we beg to report as follows :

"*One case Lemons.*—Small, clean fruit of fair quality, but it would never be worth the shippers' while to send such lemons to England, for we get far too many all the year round from Sicily, Naples, and Malaga.

"*One package Mandarines.*—This fruit was of fairly good flavour, but the appearance was poor and puffy, and the condition was unsound. Mandarins would sell well enough in this market if they came sound, *and* if fruit was scarce at the time of their arrival, but that is just the difficulty, the fruit is very rarely scarce, and even when it is, we cannot predict it, for it is an accident of some kind. A shipper might do fairly well with a consignment, but far more likely he would lose money. The medium size is best.

"*Oranges—Two boxes, each 7½ dozen.*—This fruit was of medium size, if anything rather too small. One box was of fair ordinary quality, but the oranges in the other box were of very stale and scarred appearance.

"*One box of 5 dozen.*—This fruit was, if anything, rather too large, and some of the Oranges were too rough.

"There was some waste in all the boxes, and, on the whole, we cannot praise the quality. All the fruit looked a little stale, and the "Navel" was not in all instances sufficiently pronounced. This is important. There would be a good market here for Navel oranges during July, August, and September, but we would like to see better quality.

"*Apples—Two cases of Yates', 38lbs. net.*—Good colour, bold and medium size, but many bruised. This is a late apple, and probably for this reason we have not seen many. According to this sample we think the apple would be popular, but if it cannot arrive here in the early part of the season we cannot recommend shippers to send it.

"*Two cases Nickajacks.*—A handsome apple, too large for market purposes, and rather soft. There was a good deal of waste in the box. We are rather afraid to recommend shippers to send this variety, for we can only judge by these samples that it is a soft apple, too readily bruised.

"*One box of Mixed Apples.*—The Nickajacks were again handsome, but very soft and bruised. The Rome Beauties were, as usual, very handsome, but the medium size is better for market purposes. Many of the apples were bruised.

"Speaking generally, the oranges had rather an old appearance, as thought they had been packed a long time, and the apples looked rather over-ripe and bruised.

"We cannot say that late apples *never* would do well, but the heavier the crop the sooner your shippers should send, for immediately the arrivals get beyond the demand, as you well know, prices fall terribly fast, and it is practically impossible to get them up again, for other fruits come along so quickly. For instance, at the present moment plums are so plentiful and cheap that prices for every kind of fruit are low.

"Of course, it is always possible that a moderate quantity of hardy apples would realise good prices from the middle of August to the end of September, but if too many were sent it would be a misfortune—so on the whole, we are inclined to favour the very commencement of the season. It is more certain, for the supplies could scarcely be regulated."

SULPHUR, LIME, AND SALT SPRAY.

The sulphur, lime, and salt spray that is found so valuable in our orchard has one drawback, and that is, it is so liable to cause very painful cracks in the hands and arms of those using it. Mr. J. N. Cox, however, has been able to use it for some years without any ill effects, and his mode of mixing and using same is as follows :—

Ingredients : Unslacked lime, 40lbs. ; sulphur, 20lbs. ; salt, 15lbs.

Ten pounds of lime is first slacked and boiled with the sulphur in 20 gallons of water for three hours over a brisk fire. The remaining 30lbs. of lime is then slacked and added to the mixture ; the salt is then put in and the whole boiled from 30 minutes to an hour. Water sufficient to make 60 gallons is then added. The most satisfactory time for operating is just as the buds are swelling, but before they burst.

I always do the boiling in a 50-gallon galvanized iron boiler. I dilute into a 30-gallon cask, using kerosene tins as buckets. When handling the mixture, too much care cannot be exercised to avoid injuring the hands. Contact with metal when the hands are wet with this mixture will quickly cut through the skin. As the mixture must be carefully strained before being put through the pump, I place a bran bag, or a piece of hessian loosely over the cask, and hold it in its place with a spare hoop. I use rags, which I frequently rinse in clean water, when handling the kerosene tins, hoops, or even the hessian used for straining.

The hessian has also to be rinsed frequently, as a deposit is left by each bucket of the mixture, which makes it impervious. And contact with the soiled hessian is to be avoided as far as possible, as it quickly wears through the skin. I keep an old tub handy in which I soak and rinse the soiled hessian.

It is also highly important to prepare against leaky parts in the pumps and fittings. I always keep clean rag between my hands and the pipe when spraying.

By using every precaution I succeed in operating this mixture for a fortnight without injuring my hands. When buying my experience, I wore out one pair of gloves and the skin off every finger and thumb in one morning.

Strictly avoid using the tap to the nozzle. It is better to waste a little material than to wear out valuable skin.

MULE BREEDING.

The following article taken from *The Pastoralists' Review* may prove of interest to some of our readers:—

The large increase in agriculture and the high price of draught horses is inducing several landowners to go in for mule-breeding. We have obtained from the Colonial Sugar Company a number of interesting pictures, and a report on their work in that direction on their properties in Fiji.

It is the object of this article to give some information which may be useful to those in a position to rear mules, also to compare the values of mules with that of other similar draught stock. The experience quoted is that obtained at first hand in the middle and Western states of America. Although mules are largely reared throughout the middle States, the hardiest are bred in the lower regions of the Sierras and the Rocky Mountains, the main characteristic of which is broken stony country, interspersed with small valleys, where there is always plenty of water, and in which course natural grasses are in greater or less abundance in accordance with the season. This entails much travelling of the stock over the rocky ground to pick up a living, also exposure to the severe winter weather which prevails. Much importance is ascribed to such conditions, and it is claimed in the comparison of the relative value of mules and horses that the lesser necessity for shoeing mules, the less nutritious food upon which mules will work and grow fat, the lesser liability to sickness, and their greater longevity are largely due to the conditions to which the mules have thus been accustomed when young.

In former years many stallion jacks were imported from France and Spain for use in America, but latterly the jacks bred in Kentucky are considered equally good; excellent jacks are also bred in the States of California, Washington, and Oregon, on the west coast.

In selecting mares for mule-breeding particular attentnon is given to size and bone, combined with as much quality as circumstances will allow. Those preferred by many are the progeny of Clydesdale stallions and Norman mares, from four years of age and upwards, even to fifteen years if constitutionally sound. Breeders consider the size of the jack to be less material so long as he readily covers mares, is a foal-getter, and has good offspring. Long-legged, large-bodied jacks are not in favour, but relatively small, nuggetty animals, having plenty of bone and small heads, are preferred. In America the true value of a jack is very properly assessed by his first year's colts. If these are attractive his value is doubled forthwith, and further enhanced as such develop satisfactorily.

The present value of such animals at the ranches cannot be put at much less than £200 each for four to six-year-old jacks having good offspring in evidence. To this is to be added £40 or £50 for expenses and freight by mail steamer, say £225 to £250 landed in Australia or New Zealand. In America special care is exercised in keeping jacks intended for mule-breeding apart from other donkeys or mules. It is customary for such a jack to be weaned at an early age, and from that time kept apart from other donkeys and mules, and let run with horses. It is stated to be necessary to keep jacks intended for covering mares beyond even the smell of mules. At three years of age the jack is broken to serve mares, and is then kept in a large roomy loose-box apart from other animals, in most cases also in semi-darkness, and as a rule, he is not allowed to see any other animal but the mare he is brought out to cover. It is found that jacks so treated take readily to mares.

It is noticeable that very great care is usually taken of the jacks, even to the extent of keeping their stalls fly-proof. Hard floors to the stalls are also considered essential, owing to the habit some jacks have of standing in soft ground on the foreparts of the hoofs, which gradually cause malformation, which is said to be transmissible to the offspring. It is said that a matured jack, if properly fed, exercised, and handled, should serve from sixty to seventy head of mares in a season, and get from 60 to 70 per cent of foals. In America it is considered preferable to put two mares to the jack one day and one mare the next day, it being the opinion that by so doing the jack keeps vigorous throughout the whole season. The mare to be served is generally first teased with an entire horse, and not put to the jack before she is ready to receive him. She is then backed into a shallow pit sloping towards the rear, and enclosed with railing about 4ft. high in front and 2ft. behind, with width according to the size of the animal. A light bar is passed in front of the mare's breast, and to obviate the chance of her kicking the jack a stout frame of planking is inserted behind her heels.

Provided the above precautions are taken, it is not found that there is trouble in getting jacks to cover mares, but most breeders are agreed that if a jack be allowed to cover a "jenny"—a female donkey—he will not afterwards cohabit with mares during the same season, and it is said to be frequently the case that he will not again cover any but his own kind.

It can readily be imagined that jacks treated as above described develop peculiarities. Vice, however, seems to be generally absent, but there are frequent cases on record of accidents due to nervousness of stallion jack-asses. In one case a farm hand who had been attending to some jacks for several years purchased one, and started taking him elsewhere. When fording a comparatively shallow stream the jack became alarmed when the water touched his body, and deliberately drowned himself, despite the efforts of his owner, who, being alone, was helpless.

Mules, as a class, are generally regarded by people in Australia and New Zealand as being mostly small animals of light weights, and consequently less useful than horses for the heavy agricultural and cartage work mostly required. Such description directly applies to most of the animals hitherto reared locally, but that both size and weight are as obtainable, with proper breeding, in mules as in horses can be gathered from the following particulars of a large number of mules purchased during one year in America for the Fiji estates of the Colonial Sugar Refining Company of Sydney, to whom we are indebted for the information.

Weight of Mules purchased.

	Mules.
Under 1,000 lbs. each	54
From 1,000-1,100 lbs. each	263
From 1,100-1,200 lbs. each	210
Over 1,200 lbs. each	87
Total shipped ..	614

Ages, 4-6 years. Height, 14½ to 16½ hands. The twenty heaviest mules ranged from 1,310 to 1,580 lbs. each.

Mules are not generally valued by their apparent indications of good breeding—which are usually important factors in the selection of horses—but by their bone and the weight they scale. They are seldom as fleshy as horses, and it is probably within the mark to say that two 1,300lb. mules will draw heavier loads in constant work than two horses each weighing 1,400 to 1,500lbs.

The general manager of the Sugar Company informs us that values in America for the stock they purchased were found to range from £15 to £20 per head, also that the expenses and the freight to Fiji about doubled the prime cost. Their experience, however, was that for the heavy work necessary under trying conditions of a tropical climate, such relatively higher cost of mules from America, as compared with horses from Australia, was fully warranted by the less expense for fodder, by the lesser liability to sickness, and by the greater longevity of the mules, regarding which points the following experience of large numbers of mules during several years is allowed to be quoted for information:—

Relative Cost of Fodder, and Death Rate.

	Horses.	Mules.
Fodder	As 1	to 3
Death rate	As 2½	to 1

In other words, three mules are fed at the cost of feeding one horse; and, with equal number of horses and mules working, five horses are lost by death for every two mules that die.

Mule-breeding should be a profitable business to many farmers who have large grazing areas. It will be gathered from the figures quoted above that a good neighbouring market already exists for such stock. Co-operative effort should allow of good jacks being imported, each for general use amongst those co-operating in any given district, and eventually "jennies" might also be brought down, so that by the local breeding of the jacks the cost of these could be appreciably reduced.

RAILING HORSES.

There are various details in regard to their equipment, etc., that should be seen to when horses are sent on a railway journey. It is most important, for one thing, that they should be clothed sufficiently warmly, more especially in the autumn and winter seasons, when a couple of warm, thick rugs are none too much for a horse which is being sent by rail. In cold weather three rugs are sometimes put on. In many cases it may be advisable also to provide a hood. The rug or rugs require to be put on with care, and the roller must be drawn up somewhat more tightly than is usually done in the stable, so as to avoid the risk of the rugs slipping off the horse's back in the horse-box. It is no uncommon thing to find the rug or rugs dangling from underneath the horse and torn to pieces, having been trodden upon by the hind feet, when the horse arrives at its destination, and is taken out of the horse-box. When this occurs there is risk of the horse catching cold, to say nothing of the rugs being torn and spoilt. Well-bred horses, which are of a nervous temperament, often sweat profusely on a railway journey from sheer nervousness and excitement when they are not accustomed to travelling by rail. Such are frequently found to be wet with perspiration when their horse-box is opened at the journey's end, and unless they are sufficiently warmly rugged, they may very easily catch cold.

The most suitable kind of bridle to put on a horse that is being sent on a railway journey is a snaffle or watering-bridle, with a snaffle-bit without any cheeks. Both snaffle-bits with cheeks and curb-bits are objectionable to use for the purpose, because the projecting cheeks on these bits are liable to get caught or to hook into something when the horse is in the horse-box. This kind of accident not infrequently happens, and it results either in the horse injuring its mouth or in the bit being bent. Hence the reason why a snaffle-bit with rings only, and without cheeks, is best, and why snaffles with cheeks and curb-bits should be avoided when a horse is sent by rail. The reins on the bridle must be knotted at the horse's withers, and must then be secured to the roller by means of a piece of string, so as to obviate all risk of the reins hanging down too low on one side, and of the horse catching one of its fore-legs in them.

It need hardly be said that a horse should never be tied up by the bridle in a horse-box. A leather headstall is provided in horse-boxes for the purpose of tying up the horse, this headstall being put on over the bridle which the animal is wearing. Although there is a headstall in horse-boxes, it is, as a rule, advisable to put a headstall—with a hemp halter-rein attached to it—on a horse underneath the bridle when sending it on a railway journey. The headstall and rope come in handy often enough for tying up the horse when occasion may require it. In the case of horses which are quite quiet and easy to manage there is no reason why the bridle should not be taken off as soon as the horse is safely boxed, provided, of course, that there is a headstall or a halter underneath the bridle by which to hold it. It will certainly add to the comfort of the horse on a long journey. But where horses are intractable it would be the reverse of wise to attempt to remove the bridle for the journey, as it might be difficult to put it on again quickly when the horse is unboxed at its destination, and, meanwhile, it might not be possible to keep the animal sufficiently under control without a bit in its mouth. There would be the danger of its breaking away during the process of unboxing it before the bridle could be put on.

Very commonly, when horses are sent by rail, they are provided with knee-caps. This should always be done. They serve to protect the knees effectually against injuries and blows, a horse being very liable to knock or to cut the knee-joints when travelling by rail. Frequently the knee-caps are wrongly put on. The proper way is to buckle the upper strap of the knee-cap just sufficiently tightly to keep it in place, while the lower strap should be kept very loose. There must be room for three fingers to be placed between it and the horse's leg when it has been buckled. Put on in this fashion, the knee-caps retain their place perfectly, while they do not cause any discomfort to the horse. Oftentimes both the upper and the lower straps of the knee-caps are buckled up much too tightly, with the result that the circulation of blood is impeded, and that the horse suffers discomfort and inconvenience, while the tightly-drawn straps may also chafe the skin if the knee-caps are left on for long. If the lower strap of the knee-cap is buckled up at all tightly the free movement of the knee-joint is interfered with, and the horse is hurt by the strap cutting into the skin at the back of the leg each time the latter is bent. Frequently knee-caps are used which are too small for the horse; they should be of large size in order to be comfortable.

When a horse is sent by rail the animal's legs may be further protected against possible injury by being bandaged. This is very usually done in the case of valuable horses, and the use of the bandages is an excellent plan, as they afford complete protection against external injuries. Horses do get knocked about a bit when travelling in a horse-box, owing to the jolting and lurching of the latter, and there is always some risk of the legs being cut or getting a blow. The risk of the legs being injured is much increased when the horse is nervous and excited, and does not stand quietly in the horse-box, but is unsteady and unruly, as so many well-bred horses are when they are shut up in a horse-box. The bandages need to be put on carefully, otherwise they are very apt to come undone during the journey. They should be wound round the leg right down to the coronet, so as to cover the fetlock and the pastern, as well as the canon. The forelegs are more liable to be accidentally injured than the hind ones, and have greater need of protection. For this reason horses are very often bandaged on the forelegs only, and not behind as well. In most cases it is sufficient, yet where really valuable horses are concerned it is advisable to bandage all four legs. In some cases, when a horse is being sent on a railway journey the animal is equipped with a pair of hock-boots for the purpose of protecting the hocks, but these articles are not often used. There is, as a general rule, no necessity for them, and it is only in the case of show horses and other very valuable animals that they can be advantageously used. In some few cases a leather tail-guard forms part of a horse's travelling equipment, the object of this being to prevent the hair on the dock of the tail from being rubbed. A tail-guard is, however, wholly superfluous under ordinary conditions.

To entrain horses is oftentimes a difficult job, many objecting strongly at first to go into the horse-box. Usually when difficulties of this kind are experienced the horse can be persuaded to enter by cajoling it, if sufficient patience is exercised. In the case of well-bred and highly-spirited horses great care should be taken not to rouse the animal's temper, and to avoid rendering them obstinate by rough treatment and punishment, for once their temper has been upset and their obstinacy has been excited, there is no doing anything with them at all. If the animal is nervous and afraid to approach the horse-box it should be allowed to familiarise itself therewith by looking at it for a while, and then—having gradually been coaxed nearer—by smelling at it. One must take one's time about the job, and it is no good being in any hurry over it, the chief thing being to exercise plenty of patience. In some cases it proves a good plan to cover up the eyes of the horse by putting a cloth over its head so that it cannot see, when it may allow itself to be led into the horse-box without trouble; but in many cases this expedient will not answer at all, and covering may make matters worse by upsetting the animal. It all depends upon the nature of the horse; and horses require to be managed according to their disposition. In the case of under-bred horses of a phlegmatic temperament a little forceful persuasion may not be out of place, and may prove very effective in inducing them to enter the horse-box. They usually give in to forceful measures with equanimity, whereas high-spirited horses resist all the more, and become more intractable when force is employed. Sometimes, when difficulties are experienced in entraining a horse, it proves a useful expedient to back the animal into the horse-box, and this plan may be tried when necessary.

But very frequently—in fact in the majority of cases—it is found that a horse which refuses to enter the horse-box readily when led will not allow itself to be backed into it. The loud sound which is occasioned when the horse steps on to the wooden planks of the horse-box very often frightens the animal, and causes it to break away again from the box every time it has begun to enter it. In the case of horses that are very nervous and give a great deal of trouble while being entrained it is a good plan to cover the let-down side (forming the gangway) and the floor of the horse-box with some straw, so as to prevent the wooden boards from resounding when the horse steps on them. We have occasionally found this to be a most useful and successful plan. When it is anticipated that a horse will be troublesome to entrain, the best thing is to tire the animal beforehand by giving it a couple of hours' exercise or work. That will render the horse far more amenable and tractable than when it is perfectly fresh. Care should, of course, be taken when the horse is thus exercised that it has cooled down completely before being taken to the railway station to be entrained. It would not do to put it in the horse-box when in at all a heated state, as under such circumstances there is much risk of its catching a cold.—*Farm and Home.*

GOVERNMENT LABOUR BUREAU.

SEPTEMBER REPORT.

The following is the report of the Superintendent of the Government Labour Bureau on the operations for September last:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 693. Of this number 321 were new registrations and 372 renewals, *i.e.*, men who called who had been registered during the year prior to the month of September. The trades or occupations of the 693 applicants were as follows:—Labourers, 146; handy men, 83; handy lads, 73; bushmen, 53; farm hands, 42; carpenters, 41; cooks, 27; miners, 15; grooms, 14; drivers, 13; painters, 13; shearers, 12; gardeners, 10; blacksmiths, 9; dairymen, 9; hotel hands, 9; engine-drivers, 7; plumbers, 7; gardeners, 7; kitchenmen, 6; clerks, 5; fitters, 5; caretakers, carpenters (rough), navvies, seamen, and station hands, 4 of each; brickmakers, bakers, bricklayers, engineers, firemen, printers, orchardists, survey hands, and teamsters, 3 of each; and 40 miscellaneous.

Engagements.—The engagements for the month totalled 217. The classification was as follows:—Bushmen, 41; labourers, 35; farm hands, 25; handy men, 21; handy boys, 12; cooks, 9; farm lads, 8; gardeners, 7; fencers, 6 ; shearers, 6 ; dairymen, grooms, and scullerymen, 4 of each ; hotel hands, sailors, wodcutters, waiters, and yardmen, 3 of each; carpenters (rough), 2; and 18 miscellaneous.

Kalgoorlie.

Registrations.—The new registrations numbered 32 and the renewals 26, classified as follows:—Handy men, 16; labourers, 14; carpenters,, blacksmiths, miners, and handy youths. 4 of each; engine-drivers, 3; barmen, 3; plumbers, clerks, cooks, fitters, paperhangers, and woodcutters, 1 of each.

Engagements.—The engagements were 6, viz.:—Labourers, 3; plumbers, woodcutters, and paperhangers, 1 of each.

The female servants who called numbered 27. The classification was as follows:—Generals, cooks, and housemaids, 4 of each; waitresses, 3; light generals, 3; charwomen, housekeepers, kitchenwomen, and laundresses, 2 of each; and useful girl, 1. There were 3 engagements, viz.:—General, cook, and kitchenwoman, 1 of each.

Northam.

Returns not to hand.

Women's Branch, Perth.

Registrations.—The new registrations for the month were 66 and the renewals 71. The classification was as follows:—Housemaids, 26; generals, 23; cooks, 22; laundress-charwomen, 22; light generals, 11; housekeepers, 9; useful girls, 7; lady helps, 6; nursemaids, 5; pantrymaids, 2; waitresses, 2; married couples, 1; nursery-housemaids, 1.

Engagements.—The engagements numbered 52, classified as follows:—Laundress-charwomen, 18; generals, 15; light generals, 6; useful girls, 4; factory women, 3; cooks, 2; laundry-housemaids, housemaid-waitresses, housemaids, and governesses, 1 of each.

General Remarks.

The number of individual men who called at the central office, Perth, during the month in search of work was 693. This total is 48 short of the number for August, and 35 short of that for September last year. The engagements totalled 217, this being 25 short of the total for the previous month, and 13 short of that for September last year.

During the month there were 52 men assisted by railway passes from the central office, Perth. The fares refunded totalled £29 17s. 7d., and the sum of £8 11s. 8d. was received from employers to send men, also £4 10s. 3d. to send women. At Kalgoorlie branch one man was assisted by a pass, and the sum of £8 5s. 11d. was refunded, the whole amounting to £51 5s. 5d.

The demand for farm workers throughout the month has been greater than the supply. The harvest season which is approaching will mean a still larger demand. Many of those registered as unemployed are unsuitable for this class of labour. There has been also a demand for clearers, fencers, and shearers. Contracts offered in various districts have failed to find applicants. It has been impossible to supply the shearers wanted. The general tone of the labour market is more healthy, there being decided signs of improvement.

At the women's branch, Perth, 137 women called during the month. As compared with the previous month, the number is 3 less, and 34 short of that for the month of September last year. The engagements were 52, being 5 short of the number for August and 3 less than that of September last year.

At Kalgoorlie branch the applicants for work numbered 85 (58 men and 27 women). The engagements were 9 (6 men and 3 women).

FARM NOTES FOR NOVEMBER.

By Percy G. Wicken.

During the past month the weather has kept remarkably cool, and there have been frequent showers of rain. This has kept the crops somewhat backward, but has enabled them to keep growing much later than usual, and for this reason the crops, especially in the Eastern Districts, are expected to be considerably above the average. In fact, it is stated by those in a position to know, that the crops East of Northam will be the best on record. Some of the more Southern Districts may be affected by the rainfall, but as many of the areas have received extra cultivation, it is quite possible that the yield even in these districts will be up to the average. In travelling through the country I have heard it estimated that the average yield of the State for the coming season will be approximately 13 bushels to the acre. This will leave a surplus available for export of about 2,000,000 bushels. With the price of wheat estimated to be 3s. 6d. per bushel, this will mean a sum of *£350,000* which will be brought into the State in return for our wheat crop. This amount of money circulated as it mostly will be, in the country districts, will enable farmers to effect still further improvements on their holdings, and the increased returns will stimulate farmers to put further large crops under wheat.

During 1905-6 the total area under wheat was 195,000 acres, yielding 2,308,000 bushels, giving an average yield of 11.8 bushels per acre. Last season, 1906-7, the area increased to 250,000 acres, and the yield to 2,758,000 bushels, an average of 11.0 bushels per acre ; the increase for the year being 450,000 bushels. This year a further increase has taken place, and as the price of wheat promises to be much higher this season than last, the farmer will again take heart and a much greater area will be placed under cultivation than has ever been done previously. The price of wheat on 12th October, in Melbourne, was 4s. 8d. per bushel, and the price in London on same date was about 5s. 6d. per bushel. According to advices to hand several foreign crops of wheat are likely to be failures, and this should tend to harden prices in this part of the world.

The agricultural shows are now taking place. The first in the Eastern Districts being that of the Northam Society, which this year had the distinction of also being the National Show. This was held on the 1st and 2nd of October, and being the National Show a very large number of exhibits were displayed, prominent among which was an exhibit of butter, the first made at Nangeenan, a district which has not been hitherto regarded as a dairying locality. On looking at the experiences in the dry districts in South Australia and elsewhere, we need have no fear of any of our agricultural districts not being suitable for dairying purposes, provided that proper means to conserve fodder are carried out. Another feature of the show was the fine exhibit of native grasses grown in the Nangeenan district. Samples of grass three to four feet high were shown. Of course this is due somewhat to the good season experienced, but if we devoted more attention to fertilising and improving these native grasses we should probably be in a much better position than trying experiments with exotic grasses.

The prize for the best two pounds of butter called forth a large number of entries, and some splendid samples were submitted, the judge, Mr. McFarlane, stating that the quality was first class and equal to any that could be produced elsewhere. This fact alone is evidence that butter can be produced in the Northam district, and, from conversation with townspeople, I gathered that just at the present time there is almost sufficient butter being made locally to meet the demand. Once having reached this stage, the next step, *i.e.*, producing butter to send away on a large scale, should soon follow.

The wheats shown at the National Show were very good samples, and the weight per bushel was very high. A sample of Jade variety, which took the first prize, weighed 65lbs. per bushel.

As the Department is anxious that its exhibit of wheat at the Franco-British Exhibition which is to be held in London next year should be as good as possible, the Board will, therefore, be very pleased if anyone who, during the coming harvest, obtains a sample of any good heavy wheat will either send them a bushel or two for the purpose of exhibiting or communicate with them on the subject. At the last exhibition, *i.e.*, the Paris Exposition of 1900, at which this State was represented, we had the honour of carrying off the grand prix for wheat against all other countries. We hope to be able to show as good a sample of wheat again at the Franco-British Exhibition and possibly take similar honours.

During a favourable season such as the present the bush grasses grow very strongly, and as these become dry the danger to settlers from fires is very great, as once this long dry grass gets alight it is almost impossible for human efforts to check it. For this reason settlers should, before harvesting, plough fire-breaks round all their crops, farm buildings, haystacks, etc. A couple of trips round the paddock with the multi-furrow plough will not take long, and it may be the means of saving the paddock from being burnt. Instances frequently occur of farmers having to sell their stock because they have no grass on which to feed them, and consequently they often have to sell at the worst time of the year at a low figure.

Harvesting operations will be in full swing by the time these notes are published, and those farmers who do not wish to sell their grain as soon as harvesting is completed should consider the question of erecting some sort of a grain bin in which grain can be stored until such time as they are ready to bag it. When stored in bags it is likely to be injured, and the bags very much torn by mice. When stored in bins this is not likely to occur, and the saving in bags will amount to a considerable sum. A model of a grain bin suitable for this purpose has been shown by the Department at various shows; other models can no doubt be made, and it would only take a very short time before the farmer would compensate himself for the expense of erecting a similar building.

A feature of interest during the month was the export of the first consignment of chaff from Western Australia to Victoria, which left on October 5th per s.s. "Kanowna," which consisted of 5,000 bags. Arrangements are being made for forwarding further consignments.

FARMYARD MANURE.

As soon as harvesting is over, those who have any quantity of farmyard manure should begin to cart it out on to their paddocks and tip it in heaps ready for spreading and ploughing in as soon as they are able to get on their land. A ton of farmyard manure consists of about 75 per cent. of water, about 50 to 60lbs. of ash, and about 500lbs. of organic matter. This organic matter consists of nitrogen and other food ingredients. Much greater attention should be given to the conserving of farmyard manure than is generally the case. The handling of farmyard manure requires a great deal more attention than is usually given to it. Some of the constituents being volatile go off into the air, others are soluble in water, while the most useless are the least volatile and the least insoluble. Ammonia, one of the most valuable constituents of all manures, is the most volatile, and if you allow too great heat in the decomposition of vegetable manures the ammonia as it is produced is driven away into the air. If all the rain that falls is allowed to go on the manure the soluble ingredients are washed away and it is robbed of its most valuable properties. When the manure from the yards is not carted straight on to the land it should be made into a heap; but to preserve the fertilising ingredients some special care must be taken, for this purpose straw and other vegetable matters are mixed with the excrement of animals. The economic management of the manure heap is that which succeeds in checking waste and saving the volatile and soluble constituents, which, if not protected, are allowed to escape. A cheap way to make a manure heap is to choose a position convenient for access both from where the manure is to be carted and to where it is intended to utilise it. Cover the piece of ground selected for the heap with four or five inches of road scrapings or some loose soil so as to absorb any moisture coming from the manure. On this tip the manure from the carts : this should be spread evenly and trodden upon in order to consolidate it as the heap is being formed. As soon as the heap is about a foot high, it should be gradually sloped until the apex is reached. While building the stack it is a good plan to put in about one bushel of gypsum for every two loads of manure, as well as a little loose soil. The gypsum will absorb a large quantity of ammonia which would otherwise escape. When the heap is completed and a few days have elapsed to allow the heap to settle, it should be covered on the sides and top with a layer of three or four inches more soil ; under this treatment it does not decompose so rapidly. The great point is to guard against decomposition going too far, as manure that is over decomposed is of very little value. Before use the heap should be turned over and the material at the top placed at the bottom and *vice versa.* By this means the manure will be kept in its best state for application to the soil whenever it is required.

Planting Operations.—This month these are very restricted, as, owing to the condition of our climate, we can plant very little after the crops of wheat come off the land. In the Eastern districts, as soon as harvesting work is concluded, the working the fallow and preparing for the early seeding of the following crop will be the principal operations, and farmers in these districts will have to arrange to grow fodder during the winter and spring, and convert it into silage for use during the dry season.

In the more southerly districts, in moist localities, crops of cow peas, soy beans, and possibly Rio or bugle pumpkins can be sown. Land should also be got in readines for planting out early green feed as early in the coming season as it is possible to do so.

LOCAL MARKET REPORT.

Market Report of the W.A. General Produce Company for the week ending Wednesday, October 10th, 1907 :—Business during the past week very good indeed; supplies short all round; values of produce in general have been advancing materially from day to day owing to the dry seasons prevailing in the Eastern States which has forced them to draw supplies of chaff, wheat, and flour from our surplus in the West, which ought to be very pleasing to our farming community. Detailed particulars as follow:—bacon previous scarcity continues, values are very firm; hams, supplies very short, and values ruling high; butter, no alteration in price as yet, it is thought that an advance will occur very shortly owing to scarcity of feed at sources of supply; cheese, not much offering, values firm; eggs, country lots still very plentiful, values unaltered, inclined to firm ; potatoes, imported, have eased a little, values on spot have not altered, country lots selling fairly well ; suburban garden lots newly dug in good demand ; chaff in great demand for export, and if lower freight may be secured large consignment will take place to Victoria, New South Wales, and probably Queensland; millers' lines have again advanced materially, and further rise anticipated; fruit continues being scarce, and high prices have been obtained; vegetables selling well, demand very good; poultry for table purposes, if young and fleshy, sells well.

Farm and Dairy Produce.—Bacon, sides, 10¼d. to 10½d. lb. Hams from 1s. 1d. to 1s. 2½d. lb. Butter, best Victorian, 1s. 0½d. lb.; other good brands from 10½d. to 11½d. lb. Lard, in one pound packet, 8d. lb. Cheese medium, 8¾d. to 9d.; loaf, 9d. to 9½d. Eggs, 10d. to 10½d.; suburban, 11d. to 1s. doz. Potatoes, imported, £5; country, £6 10s to £8; suburban, newly dug, 9s. to 13s. per cwt. Onions, 6s. 6d. to 7s. per cwt. Chaff from £3 5s. to £3 17s 6d. per ton. Bran, from £7 to £7 10s. per ton. Flour, from £10 to £10 10s. per ton. Oats, white, 4s. 3d. to 4s. 6d.; Algerians, 3s. 9d. to 4s. Wheat, truck lots, 4s. 2d. to 4s. 3d. bushel. Oil cake, £8 10s. per ton.

Fruit.—Oranges, navels, 15s. to 18s. per case ; ordinary, 11s. to 16s. 6d. per case. Lemons, from 6s. 6d. to 12s. per case. Mandarines, from 15s. 6d. to 21s. per case. Loquats, from 5s. to 10s. 6d. per case. Bananas, worth 22s. 6d. to 25s. per case. Passion Fruit, 12s. to 16s. per case. Cape Gooseberries, 3½d. to 4½d. lb. Apples, best desert, 14s. to 18s. 6d. per case; others from 9s. to 11s. per case.

Vegetables.—Cabbage, from 6s. to 8s. 6d. per cwt. Cauliflowers, from 2s. 6d. to 9s. dozen. Carrots, 9d. to 1s. 6d. doz. bunches. Parsnips, 1s. 3d. to 1s. 9d. doz. bunches. Turnips, white, 9d. to 1s. doz. bunches; Swedes, 1s. 3d. to 1s. 9d. doz. bunches; Swedes, bulk, 2s. 6d. to 5s. per cwt. Beans, French, from 3½d. to 4½d. per lb.; Broad, from 1½d. to 2d. per lb. Peas, green, from 2d. to 3½d per lb. Marrows, from 9d. to 2s. 6d. per doz. Pumpkins, worth £10 to £12 per ton. Rhubarb, 1d. to 2½d. per lb.

Salads and Herbs.—Lettuce, from 1s. 6d. to 2s. 9d. per quarter bag. Spring onions, from 4d. to 6d. per bundle. Beetroot, from 9d. to 1s. 9d.

per doz. bunches. Celery, from 6d. to 2s. 3d. per doz. heads. Cress, from 9d. Radishes, 6d. per doz. bunches. Thyme, Marjoram, Sage, 2s. 6d. per tray. Mint, Parsley, 3d. per bunch.

Poultry (for killing).—Fowls, prime killing, 5s. 6d. to 6s. 6d. per pair. good, 4s. to 5s. per pair. Chickens, 3s. to 4s. 6d. per pair. Ducks, 5s. to 7s. 6d. per pair. Ducklings, 2s. to 4s. per pair. Geese, 8s. to 10s. per pair. Turkeys, gobblers, from 14s. 6d. to 22s. 6d. per pair; hens, from 9s. 6d. to 12s. per pair.

Carcase Meat.—Pork, medium weight, 6d. to 6½d. per lb.

Sundries.—Corn sacks, second hand, 5s 6d. per doz. Bran bags, second hand, 3s. 6d. per doz. Bonedust, £7 10s. per ton. Phosphate, £5 10s. per ton. Guano, ammonical, £5 10s. per ton; phosphatic, £5 10s. per ton. Ammonia, 20s. per cwt. Nitrate of potash, 17s. per cwt.

NOTES ON THE CLIMATE FOR THE MONTH OF SEPTEMBER, 1907.

In South-West districts the passage of several "lows" were accompanied by the usual coastal squalls. These, however, were not as a rule of long duration, and between the disturbances fine, bright days were experienced, with a distinct feel of coming summer at times. Elsewhere throughout the remainder of the State the weather was mostly fine, and scarcely affected by the passage of these "lows." Pressure on the whole was about normal.

The rainfall was light, and almost everywhere below the average for previous years. Outside the South-West district very small quantities only were recorded, and throughout the Tropics, with the exception of the neighbourhood of Broome, no rain at all fell.

The temperature was fairly normal in all Western districts, but inland it was unusually high. In fact, like last month, it was almost everywhere the highest on record, and this unusual heat seems to have prevailed throughout the whole of Australia with the exception of a narrow strip along the West coast. The first century of the season (100 degrees) was recorded at Derby on the 26th.

W. E. COOKE,
Government Astronomer.

The Observatory,
Perth, 8th October, 1907.

The Climate of Western Australia during September, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						September, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan 1.
North-West and North Coast:	Wyndham	29·960	29·945	30·127	29·796	93 4	74·1	83·8	99·4	69·8	94·6	74·8	104·5	60·1	*Nil*	...	1,893
	Derby	29·984	29·968	30·142	29·843	93 0	65·1	79 0	100·0	56·2	94·0	65·3	103·0	49·0	7	1	2,401
	Broome	29·979	29·976	30·108	29·821	90·3	63·8	74·0	97·0	54·1	88·0	65·3	101 0	54·4	74	2	2,370
	Condon	30·001	30·002	30·146	29 844	86 0	56·6	71 3	94·8	48·9	84 6	56·3	98 8	42·0	*Nil*	...	1,011
	Cossack	30·015	30·012	30·180	29·800	89·0	63·0	76·0	99·0	58·0	86·4	60·7	98·2	50·0	*Nil*	...	2,028
	Onslow	30·035	30·024	30·214	29·881	87·5	55·8	71·6	97·2	49·9	83·1	56 0	101·0	43·5	*Nil*	...	874
	Winning Pool ...	30·063	...	30 277	29·865	87 4	52·8	70·1	97·8	44 9	...	...	...	...	*Nil*	...	1,173
	Carnarvon	30·140	30 076	30·328	29·930	76 2	57·5	66·8	91·0	46·6	74·5	56·3	95·7	43·0	17	1	1,135
	Hamelin Pool... ...	30·105	30·066	30·316	29·946	78 2	49·9	64·0	91·8	42·6	76·2	51·6	96·8	40·8	20	2	857
	Geraldton	30·138	30·096	30·389	29·761	69·8	53·1	61·4	81·2	45·7	70·6	51·8	94·0	39·0	196	11	2,319
Inland:	Hall's Creek	29·972	29·984	30·186	29·828	90·8	54·4	72·6	98·8	42·4	93·2	60·1	101 0	37·4	*Nil*	...	1,747
	Marble Bar	...	...	...	.	93·1	61·3	77·2	99 0	51·0	90·3	59·9	101·7	42·0	*Nil*	...	983
	Nullagine	30·044	30 004	30·217	29·805	89·5	52·1	70·8	96·8	42 0	86·6	53·6	98·5	34·7	*Nil*	...	873
	Peak Hill	30·070	30·033	30·284	29·770	80·6	54·0	67·3	92·0	41·0	76·3	51·8	91·0	38·1	14	2	849
	Wiluna	30·033	29·997	30·283	29·679	80·0	48·3	64·2	93·0	34·0	74·8	48·0	93·8	33·7	13	1	683
	Cue	30 076	30·063	30·350	29·710	80·0	49·5	64·8	93·0	37·3	74·9	49·3	93·2	37·0	34	2	769
	Murgoo	...	...	..	...	78·0	48·6	63·3	92·0	38·0	...	...	...	...	20	1	818
	Yalgoo	30·109	30 068	30·375	29·771	73·8	47·0	60·3	91·0	36·0	73·8	47·2	93·6	35·7	42	1	822
	Nunngarra	30·078	...	30·398	29 668	77·1	49 2	63·2	91·0	37·5	...	...	...	.	17	2	639
	Lawlers	30·090	30·056	30·367	29 759	78·4	49·2	63·8	93·0	34·2	73·5	48·2	95·2	34 7	24	2	810
	Laverton	30·046	30·044	30·359	29·601	79·8	50·3	65·0	93·8	34·0	73·1	47·5	94·5	32·3	12	1	798
	Menzies	30·019	30·066	30·320	29·590	76·7	47·8	62·2	91·0	32·0	71·4	47·3	92·1	32·5	23	1	630
	Kanowna	...	...	...	..	76·0	47·3	61·6	90·5	34·0	67·9	44·9	87·6	36·6	30	3	878
	Kalgoorlie	30·038	30·068	30·360	29·545	76·1	48·8	62·4	90·8	34·6	70·5	47·6	90·8	34·9	42	2	955
	Coolgardie	30·064	30·062	30·393	29·570	74 4	46·9	60·6	89·0	34·0	70·0	46·1	92·0	33·5	51	4	1,065
	Southern Cross ...	30·061	30 062	30.367	29·633	74·5	43·4	59·0	90·5	32·0	70·7	43·5	95·0	29·0	84	5	912
	Kellerberrin	...	...	...	..	...	...	..	...	..	...	...	...	...	110	4	1,148
	Walebing	...	...	...	...	67·8	44·0	55·9	84·0	32 0	65·2	43·3	79·9	29·9	149	12	2,200
	Northam	...	...	...	...	68·1	45·6	56·8	84·0	34·0	66·7	44·4	80·6	32·8	172	12	1,887
	York	30·096	30·086	30·400	29·717	67·8	45·9	56 8	84·3	34·0	67·4	43·2	84·7	31·8	179	12	1,827
	Guildford	...	...	...	...	66·6	49·5	58·0	76·8	39·3	67·1	48·1	88·0	36·0	466	17	3,642

The Climate of Western Australia during September, 1907—*continued.*

Locality.	Barometer (corrected and reduced to sea-level). Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Shade Temperatures. September, 1907. Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Average for previous Years. Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Rainfall. Points (100 to inch) in Month.	Wet Days	Total Points since Jan. 1.
SOUTH-WEST AND SOUTH COAST:																
Perth Gardens	30·107	30·087	30·377	29·672	65·9	52·5	59·2	74·2	41·3	67·7	49·8	87·6	35·0	394	18	3,492
Perth Observatory ...	30·108	30·092	30·400	29·645	64·9	51·5	58·2	72·2	41·0	65·6	50·0	86·4	39·0	435	18	3,670
Fremantle	30·115	30·088	30·427	29·675	64·6	54·0	59·3	72·2	43·0	64·6	52·3	84·0	44·8	333	16	3,388
Rottnest	30·098	30·083	30·388	29·662	63·7	54·8	59·2	71·0	44·8	64·1	53·5	83·0	42·6	418	17	2,567
Mandurah	...	...	...	...	64·5	50·1	57·3	70·7	31·7	64·9	49 6	82·0	35·0	368	15	4,296
Marradong	...	...	...	...	..	...	...	...	...	..	...	. .	...	337	11	2,666
Wandering	...	...	...	...	63·9	42·2	53·0	76·2	31·1	60·3	39·6	75·7	29·1	371	16	2,498
Narrogin	...	...	...	...	...	...	..	...	...	...	...	..	...	...	...	...
Collie	...	...	...	...	62·3	44·3	53·3	71·2	31·8	62·7	41 6	78·7	29·5	523	19	3,224
Donnybrook	...	...	...	...	62·5	46·9	54·1	71·2	32·0	63·8	45·4	79·6	30·6	511	20	3,649
Bunbury	30·096	30·082	30·368	29·644	64·5	51·2	57·8	71·0	37·6	60·9	49·0	83·8	32·2	404	20	3,027
Busselton	...	...	...	...	62·9	48·7	55·8	69·0	37·8	63 4	47·0	78·8	34·2	350	22	3,216
Cape Naturaliste ...	30·055	...	30·320	29·550	61·2	52·0	56·5	68·0	42·0	.	...	...	...	383	22	3,516
Bridgetown	...	...	...	...	62.3	45·5	53 9	71·9	33·0	63·0	41·9	79·2	31·5	405	22	2,959
Karridale	30·042	30·064	30·343	29·599	61·8	51·2	56·5	70·2	42·0	63·0	48·0	82·5	31·5	571	27	4,737
Cape Leeuwin	29·984	30·036	30·343	29 384	61·6	53·3	57·4	69 9	45·0	62·3	53·2	79·5	43·8	313	27	4,128
Katanning	30·053	30·062	30·348	29·600	63·0	46·1	54·6	75·0	36·1	63·3	43·3	81·1	29·8	229	15	1,747
Mt. Barker	...	...	...	...	60·6	45·9	53·2	73·2	37·8	...	...	...	...	291	19	2,695
Albany	29·988	30·036	30·298	29·500	63·6	48·6	56·1	76·1	40·0	62·9	47·2	84·8	34·0	558	19	3,378
Breaksea...	...	...	30·338	29·413	60·0	50·6	55·3	73·5	42·2	60·3	50·0	84·2	37·1	513	23	3,269
Esperance	30·003	30·062	30·349	29·529	69·2	46·3	57·8	84·6	39·2	65·8	47·7	86·6	34·3	467	10	2,441
Balladonia	30·014	30·025	30·381	29·519	74·8	46·0	60·4	93·2	35·0	67·8	43·4	87·2	28·8	48	6	823
Eyre	29·991	30·060	30·324	29·434	74·1	47·7	60·9	99·0	35·4	67·4	46·1	90·6	29·2	41	3	932
INTERSTATE.																
Perth	30·108	30·092	30·400	29·645	60·9	51·5	58·2	72·2	41·0	65·6	50·0	86·4	39·0	435	18	3,670
Adelaide	30·044	30·071	30·370	29·444	70·3	49·6	60·0	88·0	39·7	66·5	47·9	90·7	32·7	108	8	1,555
Melbourne	29·977	29·922	30·339	29·400	64·9	46·5	55·7	82·3	31·9	62·6	45·4	81·8	32·1	52	8	1,292
Sydney	30·060	30·045	30·380	29·700	71·0	52·0	61·5	91·0	43·0	66·3	51·4	89·8	40·8	27	3	2,694

* Averages for three years only.

The Observatory, Perth, 8th October, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for August, 1907 (completed as far as possible), and for September, 1907 (principally from Telegraphic Reports).

Stations.	August, 1907.		September, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
East Kimberley:				
Wyndham ...	1	1	*Nil*	...
Carlton ...	...	...	...	..
Ivanhoe ...	...	...	...	...
Argyle Downs ...	*Nil*	...	...	...
Rosewood Downs	3	1	...	...
Lisadell ...	...	...	...	...
Turkey Creek ...	*Nil*	...	*Nil*	...
Ord River ...	...	...	...	...
Alice Downs ...	...	...	...	...
Flora Valley ...	...	...	...	...
Hall's Creek ...	*Nil*	...	*Nil*	...
Nicholson Plains	...	...	..	...
Ruby Plains ...	...	...	...	..
Denison Downs	...	...	...	...
West Kimberley:				
Mt. Barnett ...	...	...	...	...
Mt. House ...	...	...	.	...
Leopold Downs...	*Nil*	...	...	...
Fitzroy Crossing (P.O.)	*Nil*	...	*Nil*	...
Fitzroy Station...	...	...	...	...
Brooking ...	...	...	...	...
Cherrabun ...	...	...	...	...
Bohemia Downs	...	...	...	...
Quanbun ...	*Nil*	...	...	...
Nookanbah ...	*Nil*	...	..	...
Upper Liveringa	*Nil*	...	...	...
Yeeda	...	...	...	...
Derby	*Nil*	...	7	1
Pt. Torment ...	*Nil*	...	...	...
Obagama ...	...	...	...	...
Beagle Bay ...	...	..	...	...
Roebuck Downs	*Nil*	...	...	...
Kimberley Downs	...	...	...	...
Broome	*Nil*	...	74	2
La Grange Bay...	3	1	8	1
Rollah	*Nil*	...	...	...
N.W. Coast:				
Wallal	*Nil*	...	*Nil*	...
Pardoo	*Nil*	...	...	...
Condon	*Nil*	...	*Nil*	...
DeGrey River ...	...	...	...	...
Port Hedland ...	15	1	*Nil*	...
Boodarie ...	...	...	...	...
Whim Creek ...	*Nil*	...	*Nil*	...
N.W. Coast—*contd.*				
Mallina	...	...	...	...
Croydon	*Nil*	...	...	...
Sherlock... ...	...	...	...	...
Woodbrooke ...	...	...	...	...
Cooyapooya ...	...	...	...	...
Roebourne ...	5	1	*Nil*	...
Cossack	*Nil*	...	*Nil*	...
Fortescue ...	*Nil*	...	*Nil*	...
Mardie	*Nil*	...	...	...
Chinginarra ...	*Nil*	...	...	...
Yarraloola ..	...	...	...	...
Peedamullah ...	*Nil*	...	*Nil*	...
Onslow	*Nil*	...	*Nil*	...
Point Cloates ...	6	2	...	...
N.W. Inland:				
Ethel Creek ..	...	...	...	...
Warrawagine ...	*Nil*	...	...	...
Eel Creek ...	...	...	...	...
Muccan	...	...	...	...
Ettrick	...	...	...	...
Strelly	...	...	...	...
Carlinda... ...	*Nil*	...	...	...
Mulgie	*Nil*	...	...	...
Warralong ...	*Nil*	...	...	...
Coongon ...	...	...	...	...
Talga	*Nil*	...	...	...
Bamboo Creek ...	*Nil*	...	13	1
Moolyella ...	...	...	...	...
Marble Bar ...	*Nil*	...	*Nil*	...
Warrawoona ...	*Nil*	...	*Nil*	...
Corunna Downs	*Nil*	...	...	...
Mt. Edgar ...	...	...	...	...
Nullagine ...	*Nil*	...	*Nil*	...
Bonny Downs ...	*Nil*	...	...	...
Middle Creek ...	*Nil*	...	...	...
Mosquito Creek	...	...	...	...
Roy Hill ...	3	1	...	...
Bamboo Springs	*Nil*	...	...	...
Kerdiadary ...	...	...	...	...
Woodstock ...	...	...	...	...
Yandyarra ...	...	...	...	...
Station Peak ...	...	...	...	...
Mulga Downs ...	...	...	...	...
Mt. Florence ...	*Nil*	...	...	...
Tambrey ...	*Nil*	...	...	...
Millstream ...	*Nil*	...	...	...

RAINFALL—*continued.*

Stations.	August, 1907.		September, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. Inland—*contd.*				
Red Hill	*Nil*	...	...	...
Mt. Stewart	*Nil*	...	...	...
Coorara	3	1	...	...
Peake Station	*Nil*	...	...	...
Nanutarra	...	...	...	...
Yanrey	...	...	...	...
Towara	5	1	...	...
Gascoyne:				
Winning Pool	5	1	*Nil*	...
Coordalia	...	...	...	...
Wandagee	...	...	...	...
Williambury	...	...	...	.
Yanyeareddy	...	...	...	...
Maroonah	*Nil*	...	..	...
Ullawarra	*Nil*	...	..	...
Mt. Mortimer	...	...	...	...
Edmunds	9	2	..	...
Gifford Creek	...	...	...	...
Bangemall	...	...	...	...
Mt. Augustus	...	...	...	...
Upper Clifton Downs	...	...	...	..
Clifton Downs	...	...	...	...
Mearerbundie	...	...	...	...
Byro	...	...	...	...
Meedo	33	3	...	...
Minnie Creek	...	...	...	...
Bintholya	...	..	...	...
Lyon's River	3	1	...	...
Mangaroon	...	...	...	...
Booloogooroo	13	1	...	..
Junction Station	29	2	...	...
Doorawarrah	18	1	...	...
Brick House	...	...	...	...
Boolathana	...	...	...	...
Carnarvon	35	8	17	1
Point Charles	36	7	...	...
Dirk Hartog	108	7	...	...
Sharks Bay	37	2	14	3
Wooramel	35	2	33	2
Hamelin Pool	35	5	20	2
Kararang	112	8	70	4
Tamala	120	8	..	...
Yalgoo District:				
Woolgorong	55	2	...	...
New Forest	51	3	...	...
Yuin	86	7	...	...
Pindathuna	..	...	...	...
Tallyrang	...	...	...	...
Yalgoo District—*contd.*				
Bindoo	...	...	218	8
Mullewa	144	8	135	6
Kockatea	149	7	..	...
Barnong	100	8	66	3
Gullewa	87	...	91	4
Gullewa House	116	9	63	3
Gabyon	133	6	[illegible]6	3
Mellenbye	95	7	68	4
Wearagaminda	107	6	39	3
Yalgoo	76	4	42	1
Wagga Wagga	106	7	42	2
Muralgarra	45	6	...	...
Golden Grove	88	5	...	...
Burnerbinmah	93	9	12	3
Nalbara	38	2	18	2
Wydgee	...	...	..	...
Field's Find	48	5	36	4
Thundelarra	98	8	22	2
Ninghan	...	...	..	...
Condingnow	...	...	. .	...
163-Mile	90	3		...
Palaga Rocks	119	2	...	...
126-Mile	86	3	..	...
90-Mile	92	...	64	...
Wilgoyne	137	12	...	...
Mt. Jackson	63	3	..	...
Murchison:				
Wale	...	...	...	...
Yallalonga	...	...	...	...
Billabalong	...	...	..	...
Twin Peaks	...	...	...	...
Murgoo	37	2	20	1
Meka	45	5	...	...
Wooleane	51	4	...	...
Boolardy	...	...	...	...
Yederadda	...	...	...	...
Woogorong	29	3	..	...
Manfred	31	2	...	...
Yarra Yarra	...	...	...	...
Milly Milly	...	...	...	...
Berringarra	...	...	...	...
Miloura	10	1	...	...
Mindoolah	38	4	14	1
Mt. Gould	...	...	...	...
Moorarie	47	1	...	...
Peak Hill	35	3	14	2
Mebian	*Nil*	...	...	...
Abbotts	10	1	*Nil*	...
Belele	...	...	...	...

RAINFALL—*continued.*

Stations.	August, 1907.		September, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Murchison—*contd.*				
Gabanintha	27	3	13	2
Bungalow	40	1	*Nil*	...
Nannine	31	3	12	1
Annean	15	2	...	...
Tuckanarra	35	2	...	..
Coodardy	..	...	...	...
Austin Downs	56	3	30	2
Cue	31	4	34	2
Day Dawn	20	3	12	1
Lake Austin	37	2	29	1
Lennonville	69	7	34	2
Mt. Magnet	50	4	24	1
Youeragabbie	..	...	..	..
Murrum	..	...	44	1
Challa	57	4	15	1
Nunngarra	52	4	17	2
Berrigrin	...	...	...	..
East Murchison:				
Gum Creek	...	...	...	...
Dural	..	...	..	..
Wiluna	*Nil*	...	13	1
Mt. Sir Samuel	15	1	1	1
Leinster	62	2	...	..
Lawlers	60	3	24	2
Wilson's Patch	72	3	31	2
Poison Creek	..	..	..	...
Lake Darlôt	34	1		...
Darda	7	1	...	...
Salt Soak	31	3	23	2
Erlistoun	16	2	...	..
Mulga Queen	12	2	...	...
North Coolgardie Goldfields:				
Laverton	28	1	12	1
Mt. Morgans	56	3	14	1
Murrin Murrin	41	2	18	2
Mt. Malcolm	26	2	*Nil*	..
Mt. Leonora	46	3	8	1
Tampa	...	...	...	...
Kookynie	43	3	16	3
Niagara	43	3	6	1
Yerilla	...	...	...	...
Yundamindera	61	2	7	1
Mt. Celia	105	4	...	...
Quandinnie	19	1	...	...
Menzies	81	6	23	1
Mulline	81	7	25	3
Mulwarrie	57	7	42	3
Goongarrie	45	5	32	2
Coolgardie Goldfields:				
Waverley	37	2	40	2
Bardoc	44	3	48	3
Broad Arrow	49	5	41	4
Kanowna	55	5	30	3
Kurnalpi	55	4	34	1
Bulong	32	4	53	2
Kalgoorlie	53	6	42	2
Coolgardie	56	8	51	4
Burbanks	21	3	45	2
Bulla Bulling	...	...	...	...
Woolubar	...	.	...	...
Waterdale	40	5	47	3
Widgiemooltha	67	7	57	7
15-Mile Condenser	43	2	37	2
50-Mile	...	...	...	...
Norseman	55	6	51	4
Lake View	110	8	...	...
Frazer Range	...	...	...	...
Southern Hills	...	...	...	...
Yilgarn Goldfields:				
129-Mile	...	...	...	...
Emu Rocks	240	4	...	...
56-Mile	123	...	92	...
Glenelg Rocks	241	4	...	...
Burracoppin	130	6	75	3
Bodallin	37	2	45	3
Parker's Road	...	...	...	...
Southern Cross	79	8	84	5
Parker's Range	154	11	43	4
Yellowdine	64	3	..	...
Karalee	68	4	85	3
Koorarawalyee	109	9	91	3
Boorabbin	99	11	103	5
Boondi	...	...	...	...
South-West (Northern Division):				
Murchison House	219	9	...	...
Mt. View	129	9	72	6
Mumby	279	17	...	...
Willow Gully	218	16	186	11
Northampton	295	10	258	6
Chapman Experimental Farm	289	12	200	9
Narratarra	...	...	...	...

RAINFALL—*continued.*

STATIONS.	AUGUST, 1907.		SEPTEMBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (NORTHERN DIVISION)—*contd.*				
Oakabella ...	245	10	200	7
White Peak ...	212	7	...	...
Geraldton ...	197	14	196	11
Hinton Farm ...	247	9	187	6
Tibradden ...	...	...	...	..
Myaree	306	16	217	10
Sand Springs ...	236	4	...	...
Nangetty ...	170	11	164	9
Greenough ...	281	12	176	6
Bokara	226	16	194	8
Dongara ...	239	14	132	10
Strawberry ...	407	17	295	10
Yaragadee ...	203	9	...	...
Urella	143	9	156	6
Opawa	197	14	146	7
Manara	198	9	140	5
Mingenew ...	263	10	199	9
Yandenooka ...	218	11	206	7
Arrino	265	10	179	6
Three Springs ...	260	16	143	9
Carnamah ...	209	12	95	8
Hill River ...	421	14	269	10
Jun Jun	228	8	..	...
Watheroo ...	253	13	99	7
Nergaminon ...	...	...	...	...
Dandaragan ...	386	15	222	10
Yatheroo ...	502	18	265	8
Moora	347	16	160	9
Walebing ...	362	18	149	12
Round Hill ...	332	13	155	11
New Norcia ...	352	17	171	13
Wongon Hills ...	244	15	...	...
Wannamel ...	422	14	239	11
Gingin	554	14	338	13
SOUTH-WEST (METROPOLITAN):				
Wanneroo ...	601	21	374	13
Belvoir	781	25	393	13
Wandu	789	23	492	19
Mundaring ...	1042	23	762	17
Canning Waterworks	852	22	520	14
Kalbyamba ...	...	...	...	...
Guildford ...	644	21	466	17
Perth Gardens ...	567	23	394	18
Perth Observatory	559	25	435	18
Highgate Hill ...	554	23	430	15
Subiaco	525	26	452	19
SOUTH-WEST (METROPOLITAN)—*cont.*				
Fremantle ...	401	23	333	16
Rottnest	313	22	418	17
Rockingham ...	546	23	412	14
Jandakot ...	773	21	478	15
Armadale ...	579	21	471	15
Jarrahdale ...	1060	21	787	17
Jarrahdale (The Chestnuts)	974	24	661	13
Serpentine ...	770	25	573	16
EXTREME SOUTH-WEST:				
Mandurah ...	672	21	368	15
Pinjarra (Blythewood)	727	22	437	18
Pinjarra ...	1101	17	551	13
Upper Murray ...	1049	23	523	20
Yarloop	850	21	533	22
Harvey	763	22	426	23
Harvey Downs ...	...	...	...	...
Brunswick ...	784	18	406	11
Collie	723	23	523	19
Glen Mervyn ...	1003	21	425	14
Donnybrook ...	694	23	511	20
Boyanup ...	944	27	494	21
Bunbury ...	542	23	404	20
Elgin	598	24	366	21
Busselton ...	625	23	350	22
Quindalup ...	771	24	427	23
Cape Naturaliste	456	25	383	22
Glen Lossie ...	580	26	360	24
Karridale ...	605	25	571	27
Cape Leeuwin ...	540	26	313	27
Lower Blackwood	813	24	442	20
Ferndale ...	907	24	493	19
Greenbushes ...	951	21	555	21
Cooeearup ...	774	25	439	25
Bridgetown ...	694	24	405	22
Hilton	653	18	...	...
Greenfields ...	567	20	390	8
Denninup ...	569	...	..	...
Cundinup ...	408	17	...	...
Wilgarrup ...	754	22	478	24
Balbarrup ...	809	17	488	13
Bidellia ...	846	17	567	13
Westbourne ...	521	22	324	16
Deeside	708	19	548	19
Riverside ...	720	20	475	16
Mordalup ...	627	14	308	10
Lake Muir ...	687	23	469	18

RAINFALL—*continued.*

Stations.	August, 1907.		September, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Eastern Agricultural Districts:				
Kokardine ...	70	3	70	3
Walgo	351	14	124	9
Dowerin ...	198	9	104	5
Uberin	277	2	...	...
Cow-cowing ...	61	4	...	...
Ejanding ...	196	7	69	3
Hatherley ...	240	14	...	...
Momberkine ...	250	10	151	6
Eumalga ...	340	16	265	11
Newcastle ...	260	13	193	9
Craiglands ...	655	16	400	11
Eadine	423	19	275	14
Chidlow's Well ...	944	23	551	17
Baker's Hill ...	501	16	.	...
Berry Brow . .	422	20	...	.
Northam ...	308	18	172	12
Grass Valley ...	261	13	134	2
Cobham	459	21	226	15
York	292	20	179	12
Burrayocking ..	302	13	105	7
Meckering ...	191	8	82	5
Cunderdin ...	222	13	162	6
Doongin	196	13	87	6
Whitehaven ...	277	14	160	6
Mt. Caroline ...	173	8	71	4
Quailing ..	159	14	98	9
Cutenning ...	140	8	99	6
Kellerberrin ...	210	12	110	4
Cardonia ...	197	14	..	.
Baandee ...	139	5	76	4
Nangeenan ...	141	8	45	2
Merredin ...	142	7	85	3
Walgormouring	160	8	84	5
Codg-Codgen ...	197	12	74	5
Mangowine ...	104	11	.	...
Yarragin ...	102	3	...	...
Koomberkyne ...	223	17	...	...
Great Southern Railway Line:				
Dalebridge ...	380	18	211	10
Beverley ...	294	14	205	11
Brookton ...	236	16	207	10
Sunning Hill ...	358	21	214	15
Pingelly ...	326	17	246	12
Yornaning ...	387	19	223	10
Narrogin ...	397	15	215	11
Narrogin State Farm	443	17	208	11
Rose Hill ...	314	12	...	...

Stations.	August, 1907.		September, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No of wet days.
Great Southern Railway Line—*contd.*				
Wagin	302	16	204	12
Katanning ...	286	19	229	15
Sunnyside ...	317	22	246	13
Broomehill ...	322	15	257	12
Woodyarrup ...	287	16	...	...
Pallinup ...	231	11	213	7
Tambellup ...	296	20	239	12
Toolbrunup ...	323	16	228	9
Cranbrook ...	381	18	285	14
Stirling View ...	361	17	224	15
Kendenup ...	620	19	339	17
Woogenellup ...	418	17	...	...
St. Werburgh's...	427	23	277	20
Mt. Barker ...	484	22	291	19
West of Great Southern Railway Line:				
Talbot House ..	361	15	258	10
Jelcobine ...	364	21	263	11
Bannister ...	597	25		.
Wandering ...	509	21	371	16
Glen Ern ...	398	22	277	12
Marradong ...	613	16	337	11
Wonnaminta ...	471	22	...	...
Williams ...	360	13	261	13
Darkan	540	10	...	...
Arthur River ...	361	14	273	12
Gainsborough ...	293	10	240	8
Glenorchy ...	482	15	336	6
Kojonup ...	507	10	283	11
Northumberland Homestead	419	22	289	19
Blackwattle ...	613	12	...	...
Warriup ...	468	23	361	19
Forest Hill ...	588	25	383	21
East of Great Southern Railway Line:				
Oakdale	280	15	256	8
Barrington ...	256	9	150	5
Bally Bally ...	290	19	...	...
Stock Hill ...	269	11	..	...
Qualin	239	11	192	6
Woodgreen ...	162	16	...	...
Peakaring ...	298	12	116	4
Glenallan ...	304	17	202	13
Gillimanning ...	...	...	...	...

RAINFALL—*continued*.

Stations.	August, 1907.		September, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of Points. 100 = 1in.	No. of wet days.
East of Great Southern Railway Line—*contd.*				
Wickepin ...	314	17	207	11
Crooked Pool ...	233	13	171	6
Nallyring ...	376	21	234	16
Yardup ...	257	16	...	...
Bunking ...	276	10	169	7
Bullock Hills ...	240	17	...	..
Dyliabing ...	. .	..	. .	...
Glencove ...	352	19	198	14
Cherillalup ...	226	15	...	...
Strathavon ...	237	18		...
Warperup ...	291	19	...	.
Woolganup ...	214	10	179	9
Chillinup ...	198	13	182	7
Jarramongup ...	147	8	..	...
South Coast:				
Wilson's Inlet ...	607	20	519	20
Grasmere ...	831	21	651	22
King River ...	624	17	444	12
Albany	723	22	559	19
Point King ...	...	..	564	15
Breaksea ...	619	22	513	23
Cape Riche ...	183	14	272	10

Stations.	August, 1907.		September, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of Points. 100 = 1in.	No. of wet days.
South Coast—*contd.*				
Peppermint Grove	243	16	364	11
Bremer Bay ...	254	13	363	8
Coconarup ...	101	10	...	...
Ravensthorpe ...	80	9	102	9
Cow[illegible]nup ...	...	...	...	...
Hopetoun ...	197	9	168	13
Fanny's Cove ...	311	9	. .	...
Parl Farm ...	343	14	...	...
Grass Patch ...	133	8	100	6
Swan Lagoon ...	140	8	.	...
30-Mile	215	10	...	...
Gibson's Soak ...	314	12	...	.
Myrup	352	13	249	12
Esperance ...	520	15	467	10
Boyatup	630	11	...	...
Lynburn ...	512	10	...	...
Point Malcolm ...	360	12	...	...
Cape Arid ...	459	11	...	...
Israelite Bay ...	182	12	110	4
Nannambinia ...	76	8	...	...
Balbinia	97	7	...	...
Balladonia ...	66	8	48	6
Eyre	84	8	41	3
Mundrabella ...	...	...	...	...
Eucla	84	8	21	2

The Observatory, Perth,
8th October, 1907.

W. E. COOKE,
Government Astronomer.

By Authority: Fred. Wm. Simpson, Government Printer, Perth.

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NOTES.

Angora Goats for Sale.—The Department of Agriculture has a few two-tooth pure bred angora bucks for sale at the Narrogin State Farm. Particulars may be obtained from the manager.

Farm Crops.—Every farmer should grow some one or other of the leguminous family of plants. If clover cannot be grown, then field peas, cowpeas, or some other pod-bearing plant shuold be tried. Besides supplying nice green picking for stock, a legume crop is one of the best to plough in as green manure.

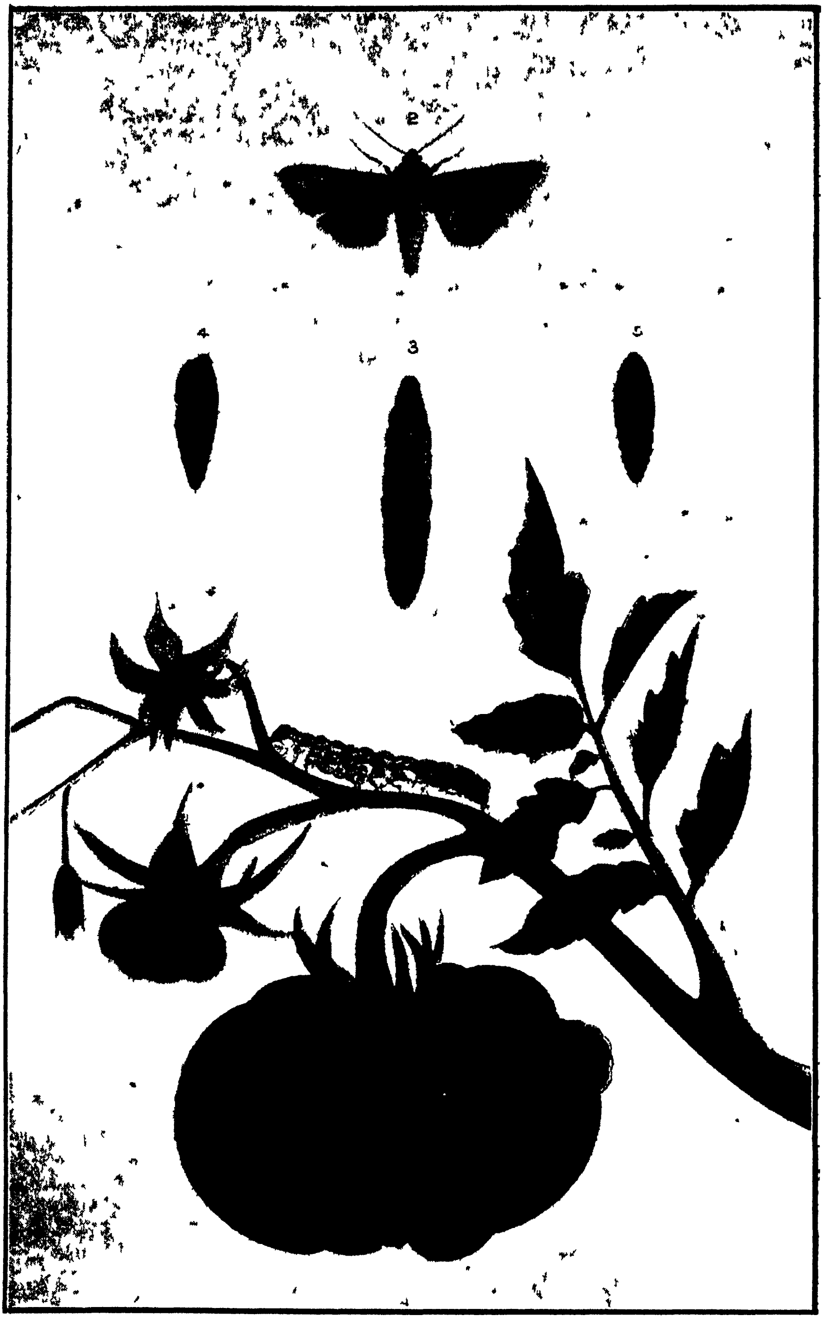
Wheat growing at Pingelly.—The farmers in the Pingelly district are to be congratulated on the prospects of their wheat harvest. Already crops have been sold at 5s. 3d. per bushel, averaging 12 bushels to the acre. It is estimated that the total present value of the wheat crop at Pingelly will realise £30,000 as against the sum of £16,000 obtained for last year's crop.

Items of Interest.—There are some figures that every farmer should remember—namely, that there are 43,500 square feet in an acre; that a cubic foot of water weighs 62.42lb.; a cubic foot of soil, if fertile clay loam, weighs 79lb.: and if a dry sand, 119lb.; of half clay and half sand, 96lb.; the surface soil is lighter than the subsoil; rich garden soil is lighter than clay, and soil from the swamps, full of peat or muck, is still lighter. It is safe to call the weight of the upper foot of soil of an acre of average loam 4,000,000lbs.

Fruit Growers' Association.—During the time the Royal Show at Claremont was being held, the opportunity was taken by the various fruit-growers present, to discuss the advisability of forming an association for their mutual protection. A meeting was convened and held on the ground, when, after some discussion, the following motion was carried: "That to promote and protect the welfare of the fruit-growing industry in this State, it is desirable that there should be an association of fruit-growers, and that such be hereby constituted, and be entitled 'The Central Fruit-Growers' Association of Western Australia.'" It was also decided that Messrs T. Price, R. Cowan, J. Hawter, J. Duce, E. Fawcett, T. Walters, W. Harper, F. H. Piesse, James, A. N. Piesse, and Cramer be appointed a provisional committee, with power to (a) appoint executive officers, (b) appoint district committees, (c) and to prepare a draft constitution. Mr. W. C. Grasby consenting to act as secretary.

Shorthorns.—The prejudice which many farmers entertain towards pedigree stock—and especially pedigree Shorthorn stock, is said to be based on the alleged difficulty of getting bulls of milking strains. In the early days of the Shorthorn boom, the cry was for nothing but beef, and so the leading Shorthorn men developed the beef properties of their favourite breed as much as possible. Experience very soon showed that Shorthorns were also required for milk, and by many of those with an eye to the future, the dual purpose qualities of the red, white and roan, came to be estimated at their true intrinsic value. It is therefore surprising that prejudice against pedigree bulls survives, for the animals now in use throughout the country are of a stamp well calculated to improve the general quality of our cattle. If people will persist in buying a pedigree bull because he is cheap, and with but slight reference to his probable utility, they cannot expect remarkable results, yet we find this occurring very often, and the natural conclusion come to by prejudiced persons is that pedigree bulls are useless.

Cold Storage.—One of the most interesting exhibits at the last Royal Show was the splendid display of fruit which had been subjected to a long term of storage in the Government Refrigerating Works; at the conclusion of the show several cases were taken to Parliament House. Mr. Wicken, the departmental field officer, displayed on a table cases of apples placed in cold storage on June 22, and also a box of raisins from Mr. J. N. Cox, of Coolup. The raisins, which had been sun dried, were of beautiful flavour, and it was stated that Mr. Cox had produced about 15 tons of this dried fruit, on which he had realised 1s. per lb., which showed a profit to the grower much above what could have been made by turning the grapes into wine. The apples shown were the Rokewood, Nickajack, Yate, and Granny Smith, and they were in perfect condition. When they were first stored their market value was 14s. per case, and five months' storage at 2d. per week would add another 3s. 6d. on to the cost. As the present market price is 25s., this experiment makes a showing of about 7s. 6d. per case profit for the orchardist or private consumer who will avail himself of cool storage.



The "Tomato Moth Grub" (*Heliothis armigera*).

1 Tomato branch with larvæ attacking fruit and flower 2 Perfect insect (natural size), from nature. 3. Larva of same, dorsal view (natural size), from nature 4 Pupa, side view (natural size), from nature. 5 Pupa, ventral view (natural size), from nature. (French's Book on Insects.)

THE TOMATO MOTH-GRUB.

(*Heliothis armigera*) (*He-li-ó-this ar-mig-era.*)

By L. J. Newman, Assistant Entomologist.

The unusual prevalence of these voracious grubs this season amongst tomatoes, potatoes, vines, orchard trees, and a number of our cultivated plants has been reported to the Department from most districts, and more especially the more forward ones. Growers have time over again been directed what to do to deal with the pest, and it is mainly for the benefit of others who are in need of information on this subject that the following notes have been prepared by the Assistant Entomologist.

This moth, which is also commonly known as the Maize Moth and Cotton Ball-worm, has a world-wide distribution.

The larvæ, when full grown, measure from 1¼ inches to 1½ inches in length, are of varying colours, from pale-green to dark-brown, making them very difficult to identify. Yet, on closer observation, the same pattern is on all, no matter what may be the colour, the body being marked longitudinally with light and dark lines and covered with black spots, from which soft hairs grow. The larvæ are voracious feeders, attacking the plants both day and night. There is practically no limit to the plants this pest will attack, feeding wherever the moths deposit their eggs. Of course they have a preference for food plants, and will leave less palatable ones, for the tomato, maize, cotton, peas, beans, vine, seed vessels of all kinds of garden flowers. The larvæ, when mature, descend into the ground and form an oval cocoon of silk and earth interwoven, and change into a brown chrysalis, from which they emerge in from three to four weeks, according to temperature.

The moth is also of varying shades, but the most common colour of the front wings is pale brownish-yellow, with a faint greenish tint ; the hind wings are somewhat paler than the front pair, becoming darker on the outer edges.

The first brood of the moth appears about the beginning of October, when the female deposits her eggs upon the stalks and leaves of plants, from which the young larvæ hatch and immediately commence operations, crawling up the stems and eating the leaves, boring into the fruit, causing it to go rotten, also destroying the flower buds. It destroys the peas and beans by boring a hole through the pods and eating the seeds. Maize is also attacked in the same manner, the young maize forming in the cob being eaten out. Fruit trees are also often attacked, the fruit being bored by the grubs and dropping off.

Remedies.

Spraying their food with a poisonous mixture, such as Paris Green, is certain death to every caterpillar eating the leaves of the plants so sprayed. One ounct of Paris Green to 12 gallons of water. The addition of a little lime will neutralise the caustic property of the arsenic, a little glue or flour will ensure its adhesion to the leaves. The Paris Green should be first mixed into a paste and then added to the water.

Poison Bait is also good. Take 10lbs. of bran, 4ozs. of Paris Green, 4lbs. of treacle, mix and work with water into the consistency of stiff dough into balls and lay at the foot of the plants.

Fresh leaves of vegetables, sprinkled with Paris Green and water, laid about also makes a good bait.

Vines and other plants affected with these grubs can also be freed by dusting the foliage with sulphur 25ib., Paris Green 1lb., the fumes of the sulphur destroying a number of them, whilst others drop off, and some are poisoned by the Paris Green adhering to the leaves they feed on.

Note.—As this is a poison all animals must be kept from it.

If it should be a field of maize attacked (as these caterpillars usually travel in one direction), cutting a trench about a foot deep around the crop, having perpendicular sides, has been recommended for destroying large numbers, as they fall into the trench and cannot get out again. If the pest is already in the crop, a succession of trenches should be cut, running the opposite way to that in which the pest seems to be travelling.

These caterpillars are heavily parasitised by a species of Mason wasp and Ichneumon fly which, as the summer advances, keep the pest in check. The spring outbreak being the most destructive.

COLD STORAGE NOTES.

By A. D. CAIRNS.

During the opening day of the late Perth Royal Show, when the pens of our most gifted scribes were running at high speed, exhausting their range of superlatives in describing Smith, Brown & Co's. "First Prize" crossbred Eastern fed Bacon, or getting into technical difficulties describing in detail the green and red painted agricultural machinery made everywhere but in Western Australia, and while the great "Dailies" were obsessed with horse, tips, and odds, an event was quietly taking place at the Port of Fremantle, that is at least worthy of passing notice from the man on the land as well as the cold-storage man.

The Federal Shire Houlder Liner "Everton Grange" of the Port of Greenock, berthed at shed I, loaded a quantity of our products that made a very respectable ship's manifest:—1,319 tons of wheat, 666 tons of flour, 109,000 lbs. of frozen lamb, not to mention wool, ore, etc., which are not immediately under our notice, though nevertheless an index of the turn of the tide. Though by no means the beginning of either of the above commodities seeking the larger markets of the world, the above substantial quantities will bring our State under notice of the British consumer permanently.

With established lines such as wool and wheat, which are comparatively cheap freights, and which under ordinary conditions land in practically the same condition as they leave here, and may be expected to fetch their price, little may be said other than that it is a pity the quantities are not much bigger.

With flour and lamb shippers, however, an anxious time is expected till the returns come to hand of how the goods stood the voyage, and met the keen searching glare of the respective buyers when the stuff is offered for sale. Certainly the poultry-keepers of this State will have a good word to say in favour of flour exportation if the price of offals can only be kept within bounds.

It is questionable if we produce fifty per cent. of our own requirements in this line, and as bran and pollard according to the October issue of the *Journal* is advancing and a further rise anticipated, flour export is of far more vital importance to us at the moment than ever. Bran and pollard quotations at the time of writing at £10 per ton of 100 bushels, compared with an annual average of about £5, is a serious question for poultry raisers and others who own domestic animals, especially pigs.

Twenty lbs of pollard for 1s. 10d. is a very heavy handicap on the ordinary householder who keeps a few fowls. Quoting your figures for October, "fowls for killing, 5s. 6d. to 6s. 6d. a pair," does not show much encouragement to poultry raisers who have been battling for a living with bran and pollard at five or six pounds sterling per ton.

The other phase of the offals question, the conservation of its fertilising properties, is too well understood to need enlarging upon here, further than that Western Australia should never export a bushel of wheat if she can help it, at any time, no matter how seductive the prices of the grain buyer from outside the State may offer. Twenty mills running on wheat are a more solid industry than the mere transport of our crop to the ship's side. The economic loss of the offals and the industrial loss to our people have to be balanced with the momentary easement of the ready cash made available.

LAMBS.

The Lamb shipment included in the cargo of this ship will be the first important one from various standpoints. There were twenty-nine brands represented, the largest parcel being about 500, the other lots dwindling down to about 70 carcases from one grower. The average weight of each carcase of the whole shipment was just on thirty-two pounds; this average looks all right, only the range from fifty pounds to nineteen pounds is somewhat lengthy. Nothing should leave the State under twenty-six pounds or over forty pounds dressed weight for best lambs. The predominance of the merino was also too evident as a whole on the hind quarters. A frozen lamb must not have hind quarters the colour of a skinned rabbit, for it will look blue on defrosting. Growers must attain a short well-filled hind leg, well covered on the outside with fat, by any means in their power. The lambs from Koogan attained good shape and condition, from the Shropshire ram and the cultivated paddock. From Koogan to Broomehill is a fair step, and it was from the latter place the Koogan stuff met a formidable rival. The Broomehill stuff, notwithstanding a thirty hours railway trip, peeled off well. Broomehill and Koogan will yet be heard of in the lamb market at Smithfield, and that they can do better goes without saying when they are doing so well already.

Some carcases showed painful ignorance of the first essentials requisite; others showed contempt of the most elementary facts appertaining to the interpretation of the phrase "Fat lamb."

Some growers having booked space were determined to fill it at all costs; they succeeded in some instances with poorly bred, badly fed, and ill-assorted weights ranging from nineteen to forty-four pounds.

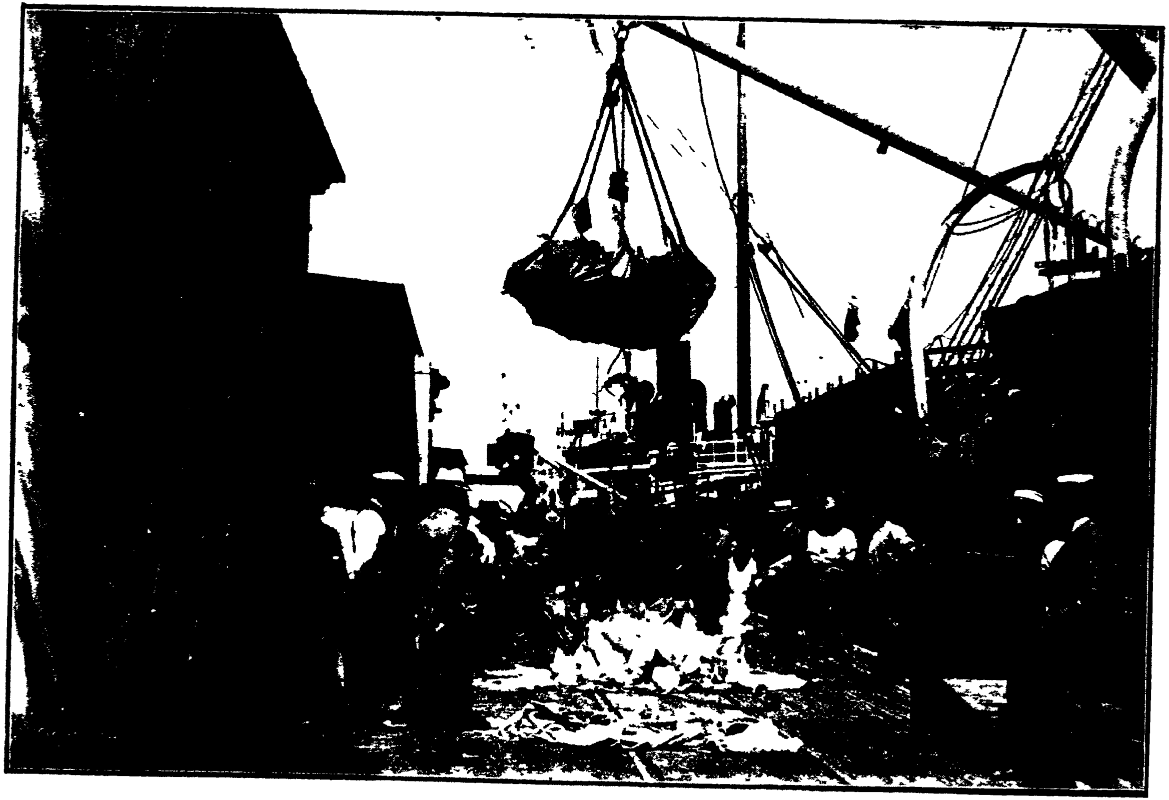
While some erred from ignorance, others deliberately erred from indifference, as no topping-off feed had been put into these alleged fat lambs, and they were therefore thin lambs. Fat lamb trade has legitimate demands as well as an unwritten code. A lamb raiser worthy of the name has a professional pride in his work that in many cases would grade out stuff and sell it at a loss rather than imperil his good name or lower the average of his district.

Some ancient looking tegs over fifty pounds bore the impress of last summer's sun on their stalwart frames. Doubtless they *were* lambs but it was some time ago. The Commerce Act of Australia was probably tested to its limit with this type; fortunately they were not many, but they are bound to make a name for themselves and us.

The Fat Lamb Trade demands cultivation of some sort of milk-producing and topping-off feed. The grass season here on an area of one thousand miles long by one hundred wide, is with us annually; but it is not all sufficient. Losses should not be expected equal to the hilly country of an Eastern State; lambs should have as good a chance here as anywhere in the world, and if forty per cent. of fat lambs were procurable from a crop in New Zealand, sixty or seventy per cent. should be available here. Regarding the grass seed worry, a lamb when it is dressed, frozen, and subsequently defrozen at the other end, has had considerable handling and bumping; add to these causes for disfigurement a number of red blotches on the belly or forequarters, and what chance has such a carcase? Fortunately, as Smithfield is cold, and bare of lambs about this season, poor stuff may be readily snapped up, and blotched stuff fetch a fair price, but is the game worth the candle?

Defrost a seed-riddled or rough-handled lamb and he looks like a skinned rabbit shot with a blunderbuss filled with duck shot! These patches of inflamed skin in which blood has infiltrated look like some repulsive affection of the beast; add to this the reasonably supposed effects of the worry accompanying such pain to the poor lamb—how can he do justice to his breed, feed, or owner, not to mention his district or State?

A Lamb Trade is not built up in a day. Growers need not send wasters to fill up a truck or ship; they cost as much to handle per head to rail, to kill, to freeze, to ship, and to sell, and bring perhaps half of what tip-top stuff would with exactly the same handling. Growers must bear in mind that the charges of the railway, the abattoir, the firm who does their shipping, is the same for the bad and good alike. Don't make a mistake at the same time and think that a fifty pound lamb pays better because it only costs as much as a twenty-six pounder to handle to London. The happy medium is the thing, neither the twenty pound light weight nor the forty-five-fifty pound teg is the best practice. If charges per head could be solved for the grower the big weights would pay him, but he must accept as the man who "pays for all" with philosophic resignation; that the railway, the freezing works, the shipping and insurance company with all their well-dressed army of functionaries, who would not probably recognise him in a crowd, must be maintained on his product; but he can only make a living and a profit *out of the best* of his flock, the poor stuff is the living of others.



Loading Lambs for the London Market, at Fremantle, per s.s "Everton Grange."

A reasonable objective to keep in view for a grower would be, from the cold storage man's standpoint, a lamb of three to five months old, weighing alive sixty to ninety pounds; the former dressing a shade under thirty pounds, and the latter about forty-three to forty-five pounds. A pound or two either way will not matter when a train journey has to be taken.

Comment might be made on the distance some of this season's shipments had to travel by rail to the freezing works; but doubtless as the business grows a great deal of weight will be conserved by having a few small works in the lamb-raising centres, and substantial depôts at the ports. The cold-storage cars can take three to five hundred lamb carcases at a time, and these cars are the best built in the Commonwealth; but at present are simply resting and waiting for the coming expansion of the cold stores industry.

ROOT ROT IN ORANGES.

By J. S JEFFERSON.

Some of the orange growers at Harvey district, having reported to me the presence of root rot in oranges and expressed a desire that I should investigate the matter, I visited a number of the orchards and examined some of the infected trees and their roots. All of those growers who had been troubled with the disease reported the finding of rotting red gum roots either touching or in immediate proximity to the infected orange roots. Judging from samples of roots which I examined I feel convinced the disease is a fungus which first attaches itself to the decaying red gum root, and thence passes into the orange roots. In some cases this fungus has started in the orange root, where the red gum root has crossed it, and when the root was dug up the fungus had only extended a few inches. In other cases the disease had travelled upwards along the root to the collar of the tree, and thence downward along other roots. The bark becomes spongy and peels off, having the same smell as the effected red gum root. Usually a decaying red gum root contracts a dry rot only, but in the case of those infected by the fungus the whole root becomes a mass of stringy pulp, and emits a peculiarly strong sour smell. When affected red gum roots are close to the surface of the ground their presence is generally indicated by the growth of toadstools. One grower informed me that in a ten-acre four years' old orangery he found 140 trees infected, and as these trees are worth about £2 each, the loss was very considerable. Forty of the diseased trees were too far gone for treatment, the remainder he saved by cutting away all diseased parts and treating the roots with Bordeaux Mixture. The best method, it appears to me, is to raise the tree, cut away all diseased parts, and carefully dress with Bordeaux. The tree-hole should then be filled in with fresh earth mixed with a little fresh lime. But as this is at best a tedious and costly process and the disease is generally advanced before the top shows signs of distress, the best remedy is undoubtedly a preventive one, namely, by applying a fungicide to the soil in the shape of a good top dressing of lime. The lime should be spread a sufficient distance from the tree to more than cover the roots. As the tree becomes older the centres of the rows could also be treated, and thus the initial cost lessened. Of course the ground would require to be turned under after dressing. Mr. Horrocks informed me that he had applied one ton of lime per acre to the twenty-five acre orangery belonging to his brother, and attributes his immunity from attack to this treatment. Mr. Beecher, who has the charge of a large orchard in the Harvey district, reported good results from the use of artificial manure around some of the trees All the trees which I saw infected were growing on the higher and better-drained ground. In fact the excessive moisture appears to kill the fungus. On one half of a ten-acre orchard the manager informed me he had found the red gum roots infected with the fungus. In this portion only he also found the orange roots infected. This part I noticed was the highest and best-drained ground in the orchard. In the other half of the orchard he found the red gum roots simply decaying away from dry rot, and in this portion he found no infected orange trees. A noticeable fact was at the spot where the greatest number of infected trees were, the plough had recently turned up red gravel. It is evident that the nature of the soil affects the growth of the red fungus, and even its existence. The symptoms by means of which the disease may be detected are premature blossoming, stunted wood growth, and yellowness of the leaf. So far as I have been able to ascertain the orange and loquat tree are the only fruit trees infected, and in my opinion the disease need not become a serious trouble, provided preventive measures are taken in time, namely, top dressing with lime or suitable artificial manures. The only grower who reported having noticed any disease in the orange roots without the red gum roots being present was Mr. Collie Leitch, who reported that he had examined a few trees the tips of whose roots had withered. Artificial manure had previously been applied to these trees, and he considered that this had saved the remainder of the roots. With his permission, I had two trees dug up, which, by their premature blossoming and yellow leaf, showed signs of distress, but found the roots all sound. In these two cases it was simply excessive moisture. The same grower has another ten-acre orangery close by, of which the soil is much less drained, and yet not a tree is infected. When at the Royal Show I left some specimens of infected roots for the purpose of submitting them to the Government bacteriologist. I have never heard of this fungus being present on roots of young orange trees planted on ground which had been cleared or rung some years previous to planting.

I have to thank the growers for the information and help afforded me in this investigation.

DAIRYING AT WANNEROO.

LECTURE by J. A. KINSELLA, Government Dairy Expert.

A large gathering of settlers assembled at the Agricultural Hall, Wanneroo, recently to hear an address by the Government Dairy Expert (Mr. J. A. Kinsella) upon some practical aspects of dairy farming. Settlers attended who were resident in some instances many miles from the hall. In anticipation of the visit of the Minister for Agriculture, who was unavoidably detained in Parliament, the hall was decorated with specimens of cabbage, swedes, wheat, rye, vetches, Yatheroo oats, lucerne, millet, paspalum, and kale, each giving evidence of the fertile nature of the soil of the neighbourhood.

The visit of the Government Dairy Expert had been arranged by the Minister for Agriculture (Mr. Jas. Mitchell, M.L.A.) for the practical information and benefit of the settlers in this district. The locality seems to be specially adapted for dairying, as the many moist and swamp lands hereabout lend themselves admirably to the growth of summer feed, and the residents realise that a great future awaits the expansion of this industry in their midst.

In the course of his address Mr. Kinsella described the climate of this State as being excellent for the "keeping" of milk and cream, and said that this was an important factor in the dairying industry. The position was different in North America, where the summer nights were extremely hot, frequently accompanied by thunder and lightning, and conducive to the "souring" of milk and cream. Another great advantage the dairyman had here was the cheapness of land as compared with New South Wales and New Zealand, where best dairying locations fetched as much as

£45 and £60 per Acre.

Then, again, this State offered the best home market in the world for the dairy products of butter and cheese. The time had arrived in Western Australia when it was realised that, if properly conducted, the calling of the dairyman was capable of being made extremely profitable. It has now become the question with farmers as to how they can "do" things so as to get the best attainable results from this line of work as a business. Dairying elsewhere had been demonstrated conclusively to be one of the most remunerative branches of agriculture. In Great Britain the production of milk ranked a good second to the production of meat. The dairying industry had developed so enormously during comparatively the last few years in the States of Victoria, New South Wales, and New Zealand that the small settler had been lifted out of the mire. The question in this State had been often asked of late: Can we dairy at a profit? The affirmative answer was to be found in the size and extent of the excellent cereal crops grown over such an enormous area as the South-Western division of the State. But the first practical essential consisted of

Laying the Foundation of the Herd

from one of the best milking strains, breeding up, and selecting and culling by means of the Babcock test. He instanced the folly and the unprofitable results that followed on the retention of "duffer" cows in the herd—a not uncommon feature to be observed in several herds throughout the State. There was no best breed of dairy cow. There were first-class milkers in all the best milking strains. He described the relative producing powers of some of the best dairy breeds—Jerseys, Guernseys, Milking Shorthorns, Ayrshires, and Holsteins. The great aim should be to feed liberally and care for the dairy cows, if best results were to be attained. Abundance of fresh water and access to salt were important, and as to the latter a few lumps of rock-salt should be placed here and there amongst the pasture. Maize, lucerne, millet, or any other forage crop which produced a large yield was the most profitable milk-producer.

Ensilage

must become in this State one of the main factors in the establishment of dairying. The Dairy Expert dealt at length with the preparation of crops, cutting and storing in silos, and described the construction of various types of silos, including the pit silo, stave silo, the making of stack ensilage, and the round-frame silo. Stress was laid on the importance of cutting or chaffing the green stuff for curing into ensilage in the silos, and of weighting the fodder when made into stacks. Particulars were also given as to the cost of making ensilage under different conditions. When properly conducted in a good silo the cost was 3s. to 4s. per ton. The feeding value of maize or lucerne was 8d. to 10d. per 100lb. A good ration for producing milk would be, for a 1,000lb. cow, 35lb. of ensilage, plus 5lb. of hay and 3lb. of bran. The two latter items furnished the protein not contained in the ensilage. With 20 or 25 first-class cows a 100-ton silo would very rapidly pay for itself. He explained what

Artesian Wells and Irrigation

had done both for the Transvaal and for many States in North America, and recommended their adoption by the farmers of this State. Here, too, a system of underground drainage carried out in the cold-soil flats would result in immense benefit. He was often met with the objection that

Competition with the Eastern States

was out of the question. His view was that there was no question of competition with those States. The all-important question was: Could farmers here carry on dairying at a profit under present or even under lower prices ruling for produce? And the answer was: If they made a good article—which they could—they could always find a ready sale for it, and at profitable prices. It might as well be argued that Victoria and New South Wales should not dairy because they could not compete with Denmark. The latter country realised in the London market 10s. to 12s. per cwt. more for her butter than the Australian article fetched. Yet Victoria and New South Wales found ready sale for their two and a-half millions sterling worth of butter, at prices which handsomely paid their dairymen, and that after paying heavy steamer freights, commissions, and insurance. In Western Australia, however, they had an ever-ready market at their doors for up to £400,000 worth of dairy produce annually. There was that volume of trade to overtake before they would have to compete with the sister States of the Commonwealth in the world's markets.

The Milking Machine

had practically solved the labour question in connection with dairying. Scores of milking machines were now in use in the Eastern States and New Zealand, where some five years ago the child-labour question was becoming a serious problem. He described the installation and working of the machines, and emphasised the advantages of co-operation among dairymen for the handling and marketing of their produce. Great credit was due to private enterprise for the investment of large sums of money in the establishment of dairying in the East and in New Zealand in its initial stages, and doubtless manufacturers in this State would receive fair treatment and encouragement in their attempt to build up so important and profitable a branch of agriculture. His duty, however, was to supply dairymen with all the information at his disposal and help them establish, control, and run their own businesses if they so desired. The care and treatment of milk and cream on the farm were described, and the causes of butter not "keeping"; practical hints being given as to how to overcome the difficulty, and

The Gospel of Cleanliness

being strongly impressed. When dangerous bacteria found their way into the milk from some unclean source, or in process of manufacture, no amount of preservatives would make the butter of good quality. At the same time one-half per cent. of boracic acid would prevent butter from getting stronger in flavour.

At the conclusion of his address Mr. Kinsella was asked and answered a number of questions of an informative nature relating to dairying. In reply to a question from one of his audience, Mr. Kinsella explained the system of co-operative factories successfully in vogue in other States. The *modus operandi* resulted thus: The dairyman received absolutely everything that was returned from the milk, with of course, the cost of manufacture deducted. The cost depended largely on the output of the factory. Where the manufacturing charge would be, say, 2d. per lb. of butter, with a large concern turning out five or six tons a day, the charges of manufacture were often reduced to 1d. per lb.

In answer to another query, Mr. Kinsella recommended the construction of a silo as elevated as possible, because the greater the height the more pressure was brought to bear on the ensilage, which would also "cure" more satisfactorily. A silo 24ft. high and 18ft. diameter would hold 100 tons of cut fodder.

The proceedings terminated with a hearty vote of thanks to the lecturer, and the Minister for making his services available to the meeting.

GOLDFIELDS GARDENS.

REPORT by G. CHITTY BAKER.

The following report and list of awards in connection with the recent garden competitions at Northam and on the goldfields, conducted by the Goldfields Water Supply Administration, have been furnished by the judge (Mr. G. Chitty Baker):—

Class "A."—Gardens of an assessed value of over £50. Three prizes and a trophy. Five entries.—S. Hocking, Piccadilly, 1; F. B. Trude (late J. Brennan) 2; E. Graham Price, 3. The first two gardens being disqualified owing to having won the silver trophy in previous competitions, I award the first prize and trophy to Mr. E. Graham Price, the second and third prizes going to Mr. S. Hocking and Mr. F. B. Trude respectively.

Class "B," Kalgoorlie (27 entries).—A. G. Lovell, Lewis-street, 1; H. Blatchford, Campbell-street, 2; F. Cook, Piccadilly, 3; R. J. Geere, Hare-street, and Mrs. Renowden, Campbell-street, highly commended.

Class "B," Boulder (13 entries).—E. Pascoe, Vivian-street, 1; P. Dawson, Vivian-street, 2; J. Paul, Leviathan-street, 3; S. E. Scupin, Millin-street, highly commended.

Class "B," Kanowna (10 entries).—G. Richardson, Golconda-street, 1; M. A. McCabe, Mercer-street, 2; L. Ogilvie, Mercer-street, 3.

Class "B," Coolgardie (10 entries).—Mrs. J. A. Scouler, Coolgardie W., 1; A. P. McCormack, Clifton-street, 2; D. McPherson, King-street, 3; Mrs. Powell, Jenkin-street, highly commended.

Special Entries.—Orchard and fruit gardens, Kalgoorlie (six entries).—G. Whitlock, Coolgardie-road, 1.

Class "A," Northam (5 entries).—J. C. Ackland, 1; L. Throssell, 2; Dr. Rockett highly commended.

Class "B," Northam (12 entries).—S. A. Pope, Forrest-street, 1; H. P. Colebatch, 2; J. W. Paterson highly commended.

"The judging was done on the point system used on previous occasions. There were more entries in each class than in former years. The gardens were much better and competition more keen, so much so that I am unable to refrain from highly commending several of the competitors who just missed being placed as prize winners. A peculiar feature in this year's competition was the awarding for the first time of the maximum number of marks for any one feature. This was in the case of Mr. S. E. Scupin, Boulder; yet, notwithstanding this, the competitor, failing to score under any of the other headings, was unable to gain sufficient points to place him in one of the first three places. It is pleasing to note that far greater interest is being taken in gardening, and more definite lines are being followed out. While one strives to excel in the cultivation of flowers, another prefers pot plants and shade-houses, while others devote their energy to raising fruit and vegetables. This being so, it follows that the one who does a little of all kinds of cultivation stands a much better chance, under the present conditions, than those who devote their whole energy and skill in trying to excel in any one of the many branches of cottage gardening. May I be allowed to suggest that in future competitions encouragement should be given to all, and additional prizes awarded to the one who scores the highest points in either of the following:—1. The best lawn, combined with shade. 2. The best flower garden (not necessarily the choicest plants). 3. The best display of pot plants. 4. The best vegetable and fruit garden.

"With regard to the championship prize, while this is open to all who care to enter in Class 'A,' it is obvious that the average gardener who does all the work himself, or with the help of his wife, could not hope to compete successfully with the more fortunate ones who, although perforced to enter under Class 'A,' are in the position to employ skilled labour in the cultivation of their ground. As I feel sure that a championship medal would be very highly prized by competitors in Class 'B,' may I suggest that something of the kind be offered for the best all-round cottage garden. The encouragement given by your Department is highly appreciated by all I came across, and I would like to draw the attention of the various municipal bodies to the fact that, while the cultivation of the soil improves the sanitary condition of the home, it also assists in enhancing the appearance of the whole town. In other places the municipal councils outside the water scheme area and having no interest in the water supply undertake the whole of the work in connection with the giving of prizes, etc., as instanced at Leederville, and still greater results might be obtained on our goldfields were these bodies to lend their aid in offering special prizes or trophies and assist in encouraging their people to follow an industry that is at the same time conducive to the health of the body and improvement of the mind. A man who loves his garden is generally a good husband, a fond father, and a most desirable citizen The study of nature at all times tends to broaden the ideas, improve the mind, and bring out the most noble attributes that one possesses, which, perhaps, under other conditions, might be allowed to remain latent and unused. My best thanks are due to the officers of your Department in the various districts for the assistance given and the kindness shown."

LONDON POULTRY DEMAND.

Interesting Figures.

The London correspondent of the Melbourne *Age* writes on the above subject as follows :—

"London's gigantic food supply is an exhaustible source of interest. It grows at such a rate that mere statistics will presently cease in some cases to convey any definite impression of its magnitude. Looking at the average city man, or even at the selected youth, who parade the streets at intervals in volunteer battalions, one wonders why there are not better physical results from the greatly increased consumption of foods rich in proteids. Fresh meat was once a luxury ; everybody uses it now, in addition to vast quantities of dairy produce. At this year's National Poultry Conference Mr. Verney Carter (the principal expert of the Poultry Organisation Society) estimates that in 1906 the London people consumed from 7,000 to 8,000 millions of eggs, and 15,000 tons of poultry. In a little more than 40 years the country has increased its importation of eggs from £835,000 to £7,098,137. And then there is the home production to be added. That has always been considerable, and is growing. The eggs and poultry sent to market from British farms last year were valued at £11,500,000, of which £9,500,000 represented eggs.

"How great a demand there is for good poultry is suggested by a range of market prices which Mr. Carter quotes. During the spring chicken season, which extends from March to June, Surrey fowls sold from 3s. 6d. to 6s. each ; ducklings realised from 3s. 8d. to 8s. 6d. each ; spring goslings, from 5s. to 7s. 6d. each. In June and July, when ducks are most in demand, they sell at from 3s. to 4s. each. Between August and November prices for all kinds of poultry are comparatively low, but after the latter month they recover rapidly, and at Christmas they reach their maximum. The prices for home-grown birds are determined by size and quality. Russian and American ducks are sold by the pound, the former realising from 6d. to 9d. per pound, and the latter from 9d. to 10d. Australian ducklings are sold on the English plan, and usually realise from 3s. to 4s. each.

"'It is a curious fact,' says Mr. Carter, 'that, while the demand for quality is increasing, the public are at the same time learning the value of frozen or cold-stored poultry. Twenty years ago they would not have looked at it.' The fact is a sign of good sense on the part of the English consumer, but it can hardly be described 'curious' in these days; it is simply the development of a public taste which began with the importation of frozen beef and lamb. The English people are now fully aware that they get excellent value for their money in frozen produce of all kinds, but they are shrewd enough not to be too frank in admitting the fact. According to Mr. Carter the demand for small birds weighing from 2lb. to 2½lb. is growing enormously. These are required by the hotel and restaurant trade, and good prices are obtainable. The point is worth noting by Australian exporters."

POULTRY NOTES.

SECOND EGG-LAYING COMPETITION AT SUBIACO.

[Commenced July 1, 1907.]

The following are the results up to October 31 :—

The figures in black indicate the highest for the month.

The first column of figures shows the present position of the pens in the competition.

FOWLS.

Six pullets and one male bird in each pen.

	Owners and Breed.	July.	Aug.	Sept.	Oct.	Total.
1	J. Stuart, Golden Wyandotte	**126**	143	146	152	567
2	A. H. Padman (S.A.), White Leghorn ..	106	145	147	**165**	563
3	J. and T. Robertson, White Leghorn ...	111	137	150	152	550
4	O.K. Poultry Yards, White Leghorn ...	116	141	140	144	541
5	Sunnyhurst (S.A.), White Leghorn ...	78	150	**153**	158	539
6	Mrs. H. M. Kelley, Golden Wyandotte ...	123	141	148	124	536
7	S. Craig, White Leghorn	108	130	141	151	530
8	J. D. Wilson, Brown Leghorn	117	129	140	143	529

FOWLS—*continued.*

	Owners and Breed.	July.	Aug.	Sept.	Oct.	Total.
9	Craig Bros., White Leghorn	99	137	140	151	527
10	C. R. Herbert, White Leghorn	101	138	147	138	524
11	F. Mason, White Leghorn	115	127	140	138	520
12	North Lake Egg Farm, White Leghorn ...	103	125	143	141	512
13	L. Dobson, Silver Wyandotte	119	132	127	131	509
14	Glendonald P.F., Golden Wyandotte ...	74	159	141	119	493
15	Coolgardie Poultry Farm, White Leghorn	87	126	136	141	490
16	Mrs. McGree, White Wyandotte	66	135	140	148	489
17	Mrs. H. J. France, White Leghorn ...	60	135	145	149	489
18	Perth Poultry Farm, White Leghorn ...	97	115	134	142	488
19	Scottish-American P.F., White Leghorn ...	81	115	142	149	487
20	O. James, White Leghorn	87	140	131	129	487
21	Mrs. M. Hughes, White Leghorn ...	62	137	143	145	487
22	A. and G. Buttsworth, Black Orpington ...	107	116	128	134	485
23	Savage and Jones, White Leghorn ...	104	109	131	140	484
24	J. Faulkner, White Leghorn	77	129	136	135	477
25	G. George, White Leghorn	91	100	138	140	469
26	J. R. Parkes, Brown Leghorn	94	104	132	138	468
27	Austin and Thomas, White Leghorn ...	88	100	131	149	468
28	Bassett and Titterton, White Leghorn ...	75	136	136	120	467
29	E. E. Ranford, Minorca	67	122	136	141	466
30	Chas. Thomas, White Leghorn	90	106	131	139	466
31	White Wings P.Y., White Leghorn ...	106	76	141	141	464
32	C. W. Johnson, White Leghorn	65	111	131	139	446
33	A. F. Farrant, Buff Orpington	120	121	107	98	446
34	Digby Poultry Yard, Brown Leghorn ...	53	121	136	134	444
35	A. F. Farrant, Partridge Wyandotte ...	108	115	108	109	440
36	Adelaide Yard, White Leghorn	67	97	133	134	431
37	Master Staines, R.C. Brown Leghorn ...	58	126	124	123	431
38	J. Stuart, Buff Orpington	76	132	125	94	427
39	F. E. Tull, White Leghorn	85	114	113	114	426
40	R. A. Dusting, Minorca	51	118	121	133	423
41	B. Tonkin, White Leghorn	68	101	126	127	422
42	E. Krachler, R.C. Brown Leghorn	73	111	123	114	421
43	Adelaide P.Y., R.C. Brown Leghorn ...	56	98	129	132	415
44	G. A. Innes, White Leghorn	44	82	144	140	410
45	A. F. Farrant, White Wyandotte	70	111	123	106	410
46	Sunnyhurst (S.A.), Black Orpington ...	61	111	119	114	405
47	B. Jones, White Leghorn	16	100	135	152	403
48	Scottish-American P.F., Brown Leghorn ...	66	102	106	128	402
49	Mrs. H. M. Kelley, White Leghorn ...	40	100	125	136	401
50	O.K. Poultry Yard, R.C. Brown Leghorn...	66	112	113	104	395
51	J. Stuart, White Rocks	65	99	104	110	378
52	G. M. Buttsworth, White Leghorn ...	51	125	97	101	374
53	J. Stuart, Silver-pencilled Wyandotte ...	27	125	122	98	372
54	Buff Poultry Farm, Buff Orpington ...	57	99	100	111	367
55	L. Despeissis, Houdan	64	73	82	127	346
56	Jas. Kirk, Silver Wyandotte	50	118	102	71	341
57	Thamar Poultry Farm, White Leghorn ...	50	104	91	95	340
58	Honnor and Forbes, Minorca	12	91	129	103	335
59	W. R. Read, Golden Wyandotte	49	89	103	91	332
60	A. F. Spencer, White Leghorn	27	62	102	133	324
61	Craig Bros., Black Orpington	23	80	110	111	324
62	D. Young, Black Orpington	14	73	118	96	301
63	Mrs. E. Byass, Salmon Faverolles	29	54	96	87	266
64	Non-competitive, crossbreds	0	62	81	85	228
	Totals	4,696	7,272	8,092	8,137	28,197

Winner of first monthly prize, J. Stuart, Golden Wyandotte, 126 eggs; second month, Glendonald Poultry Yard (E. W. Stanes), 159; third month, Sunnyhurst White Leghorn, 153 eggs; fourth month, A. H. Padman, 165 eggs.

Winner of first three months' test, J. Stuart, Golden Wyandotte, 415 eggs.

DUCKS.

Six ducks and one-drake in each pen.

	Owners and Breed.	July.	Aug.	Sept.	Oct.	Total.
1	G. Thomson, Indian Runner	**160**	177	163	171	671
2	R. A. Dusting, Indian Runner	114	**182**	167	177	640
3	Mrs. H. J. France, Indian Runner... ...	145	156	161	161	623
4	Scottish-American P.F., Indian Runner ...	120	175	158	168	621
5	F. King, Indian Runner	109	174	165	164	612
6	Adelaide Poultry Yard, Indian Runner ...	47	160	**173**	171	551
7	Austin and Thomas, Indian Runner ...	119	137	148	134	538
8	White Wings P. Yard, Buff Orpington ...	60	158	157	155	530
9	A. J. Walters, Buff Orpington	93	135	130	162	520
10	South Perth P. Co., Pekin (No. 2)... ..	35	157	170	149	511
11	L. Mellen, Indian Runner	44	137	165	160	506
12	C. W. Johnson, Indian Runner	105	136	129	122	492
13	D. F. Vincent, Indian Runner	49	109	158	175	491
14	Smith and Davenport (Vic.), Indian Runner	0	129	166	**182**	477
15	M. Kynaston, Indian Runner	75	99	144	142	460
16	S. A. McColl, Buff Orpingtons	11	127	155	154	447
17	E. Trenberth, Pekins	8	88	**173**	173	442
18	J. and T. Robertson, Indian Runner ...	54	117	123	137	431
19	South Perth Poultry Co., Pekin (No. 1) ...	0	68	165	152	385
20	T. Anderson, Indian Runner	11	32	165	170	378
21	North Lake Egg Farm, Indian Runner ...	0	58	157	157	372
22	Bon Accord, Buff Orpingtons	9	1	113	170	293
	Totals	1,368	2,712	3,405	3,506	10,991

Winner of first monthly prize of 10s., G. Thompson, Indian Runner, 160 eggs; second month, R. A. Dusting, Indian Runner, 182; third month, Adelaide Poultry Yard, Indian Runner, and E. Trenberth, Pekin, equal, 173 eggs; fourth month, Smith & Davenport, Indian Runner, 182 eggs.

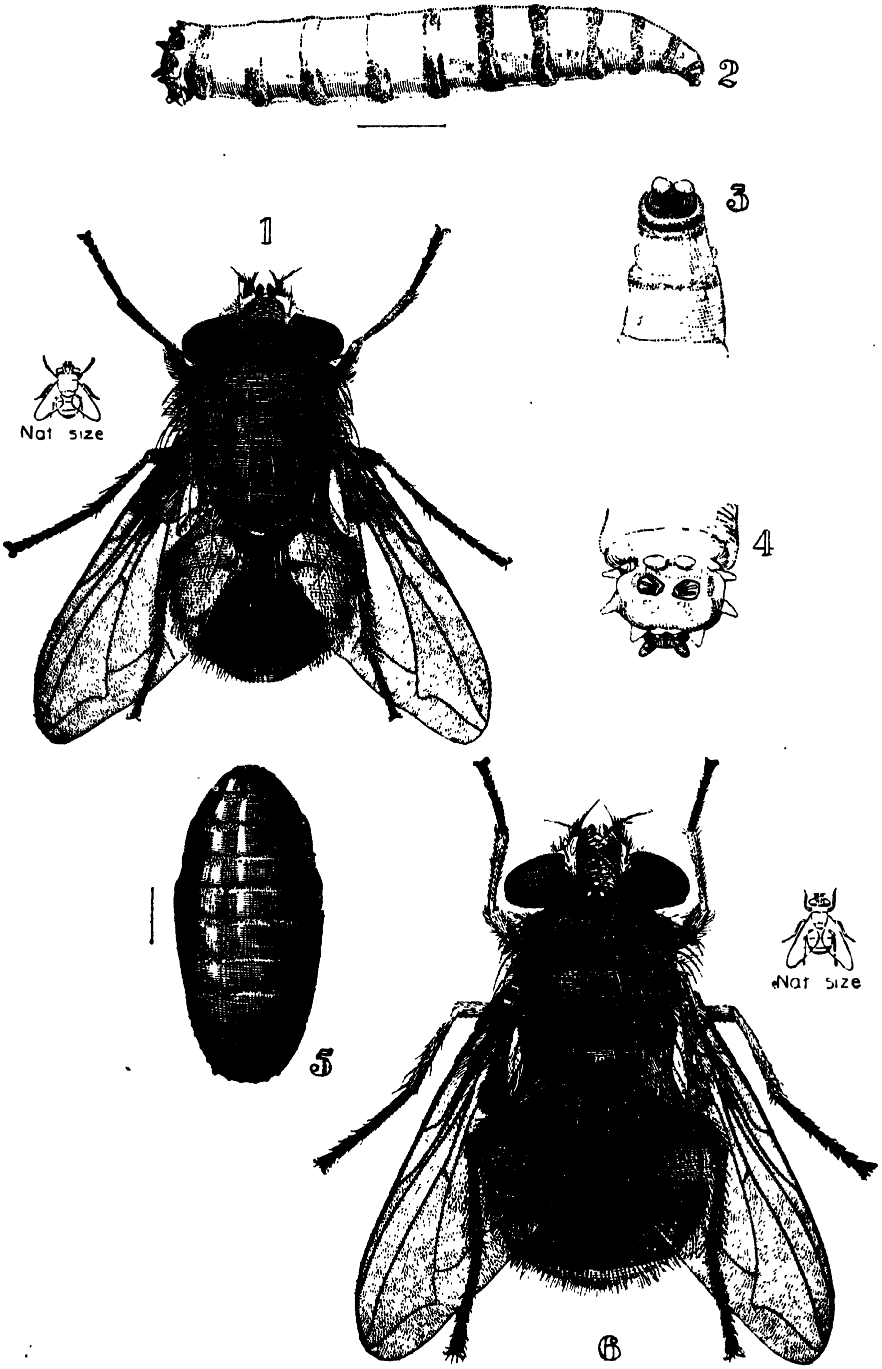
Winner of first three months' test, G. Thompson, Indian Runner, 500 eggs.

MOLASSES AS AN EGG FOOD.

The efficiency of molasses as a tonic and alterative for human beings is pretty widely known and largely used. The food value of all forms of sugar is also a matter of fairly general knowledge. With a view of testing to what extent these facts apply to poultry feeding, Mr. James Stewart, of Berowra, N.S.W., has been for some time experimenting with molasses mixed in the morning mash, and, to use his own words, he is now satisfied that "it is one of the finest additions to our poultry foods as an egg-producer and as a general tonic it is superior to any of the high-priced poultry foods on the market."

"I was led," he says, "to try the effects of molasses on fowls through reading an account of some experiments in connection with the Austrian army. The soldiers were supplied with varying proportions of sugar in their daily ration, and it was found that those men who had the largest quantity of sugar were capable of the greatest and most prolonged exertion. I had also heard that molasses was given by dairymen, who found that it increased the quantity of milk. Further, a friend, Mr. W. White, informed me that all his horses for over 10 years had had molasses mixed in their food, and he found it most beneficial. It was a simple process of reasoning to conclude that fowls would also benefit by its use, but the question arose: Would it be too fattening?"

PLATE I.



No. 1—(*Calliphora oceanicae*). No. 2—Larva. No. 3—Head of larvæ, showing hooks. No. 4—Anal Segment of larvæ. No. 5—Pupa. No. 6—The Common Blow-fly (*Calliphora villosa*).—(*Agricultural Gazette*, New South Wales.)

Mr. Stewart went on to say that he hunted up the analysis of molasses, and found it was: Water 92.00, albuminoids 2.00, carbohydrates 4.50, food units 9. These figures dispelled any doubts about it being too fattening, as its nutritive ratio is almost 1 to 2, and is about the same as separated skim milk, the analysis ofwhich is: Water 90.6, dry matter 9.4, albuminoids 2.9, carbohydrates 5.5, food units 10. Having satisfied himself about its non-fattening qualities, he began to use it at the rate of one-eighth of an ounce per fowl daily, and found that for the first week it scoured the fowls pretty badly but almost immediately the egg yield increased. He thought that he might advantageously double the quantity of molasses, and give ¼oz., but that scoured too much, and he discontinued its use. Down fell the egg production at once, so he went back to the one-eighth ration, with the result up went the egg yield again.

"I now," he added, "give daily one-eighth ounce, and find that the fowls are in better condition and lay better than they ever did. I have had better fertility, better hatches, fewer chicks dead in the shell, no cripples, and healthier chicks this year than ever I had in my experience, and I know of no other cause than the molasses. Apart from its food value, molasses has some peculiar tonic effect, and in that respect is superior to Epsom salts. I know of several other poultrymen who have tried molasses, and they speak very highly of it. I have also given brown sugar to my chicks, and it is marvellous how they go for it, and seem to thrive well on it. When once they get used to it they rush the sugar tin and never leave until it is cleaned out."
—*W.A. Poultry and Dog Gazette.*

SHEEP MAGGOTS AND BLOW-FLIES.

By L. J. Newman.

There are several species of these flies which are all more or less troublesome in their season and district. As our flocks are increasing rapidly every year, it behoves us to look at this matter seriously, because, if neglected, it will become a great pest amongst the sheep farmers of the State.

These flies deposit their eggs on the wool, where the grubs, after hatching, live on yolk, also about the tail and other parts, which are contaminated by diarrhœa caused by rank green feed. Further, they find out sores of all kinds, and are very frequently found among rams and other sheep after fighting, in wounds and abrasions of the head. They are also troublesome during the time of lambing, the ewes being struck while they are down. The time of tailing and marking the lambs is always dangerous. Foot-rot, scab, eye injuries and other disorders have been found attacked.

The female lays her eggs in clusters, of about 50, well down in the wool. These hatch within 24 hours into active maggots. In many instances the living larvæ are deposited by the fly.

Directly the eggs are hatched or the young larvæ deposited, they begin to burrow and torment the animal, the sheep become very uneasy, stamps, shakes the tail, runs about; or they may stand listless, with head hanging down, and apart from the rest of the flock. The wool, where attacked, is usually raised and rough. The irritant effects of the larvæ on the skin causes an exudation of offensive matter, which gives the wool a bad odour and colour, at the same time matting it together.

The maggots bore into the skin, which becomes hot, red, and swollen. Recovery often follows, but generally there are successive attacks made, and if neglected the disorganisation extends sometimes into the very muscles, and eventually the poor animals die a most painful death.

During the autumn months of March, April, May, and the spring months of August, September, and October, these flies are at their worst, coming some seasons in swarms, particularly before rain and during moist, mild weather.

The most harmful blow-fly to sheep in Australia is the *Calliphora oceanicae* (Fig. 1, Plate I.). It is found in all latitudes and altitudes, and is very common in the houses. The head is reddish, the back slate, legs and under parts reddish yellow, abdomen smooth and shining with an inverted V-shaped central portion, metallic blue with a yellow blotch on either side. Froggart describes the larvæ as follows:—They measure slightly over half an inch, of a dull white, semi-transparent tint. It is of the usual elongate form, slender at the head, cylindrical, and broadest at the tip of the abdomen. The pupa is enclosed in the usual dark reddish-brown, oval-shaped pupa case, from which the fly emerges a fortnight later.

The Common Blow-fly (*Calliphora villosa*), Fig. 6, PlateI., is common in the house and bush, and is generally in evidence more or less all the year round. It is particularly troublesome during spring, early summer, and autumn, sometimes coming before rain in perfect swarms. The colour is slate-grey above, head and legs reddish-brown, under side thickly clothed with golden hairs. Froggart describes the larvæ as the usual elongate maggot, white and semi-transparent.

It has been reported that this fly also attacks the sheep at certain seasons and districts, but is nothing like the pest *Calliphora oceanicae* is—the one previously described. From a casual observance they are much alike.

Another dangerous species is the *Lucilia sericata* or Blue Bottle Fly (Fig. 3, Plate II.). This is a well-known sheep fly in many parts of the world, doing a great amount of damage in England. This fly, by change of its food in the larval stage, has become a dangerous parasite of the sheep. The larvæ used to live in dung or dead flesh, but now infests the flesh of living sheep. Froggart describes them thus: They are smaller than the ordinary blow-fly, of a rich metallic green colour, with coppery tints on the abdomen, transparent wings marked with black veins. The larvæ is of cylindrical form, head portion slender, furnished with a pair of curved jaws. The body gradually thickens to the last segment, and somewhat flattened behind. The maggots are legless. There are several varieties of blue bottle flies found in Australia. The large Blue Bottle Fly (*Lucilia tasmaniensis*), Fig. 7, Plate II., also the Red Bottle Fly (*Lucilia caesar*). The last two mentioned, among others, are reported to be more or less troublesome to sheep.

The Common House Fly (*Musca domestica*), Fig. 4, Plate II..—It is found all over the world, and is one of the most aggravating pests of man during the summer months. The eggs are laid in stable or other manure, rubbish heaps—in fact in any decaying material where there is warmth and moisture—from which the maggots emerge in a few days according to temperature, and in the course of from six to ten days pupate, from which the perfect insect emerges.

The Smaller House Fly (*Musca corvina*), Fig. 5, Plate II.—Its size is somewhat smaller than the ordinary house fly and more elongated. These last two house flies do not attack the sheep in the same manner as the blowflies, but are extremely troublesome and irritating to animals of all kinds.

Remedies.—In the first place, all dead animals on the farm or station not fit for consumption should be destroyed by burning, as if this is not done they become the breeding ground for all kinds of blow-flies. Many authorities in the Eastern States attribute the enormous increase of the fly to the poisoning of the rabbit and the dead carcases being left to rot, thus breeding countless numbers of flies.

In this State the practice of killing the kangaroo and skinning and leaving the flesh to rot is a great source whence large numbers of the fly come.

A dirty camp, where all the refuse is thrown on one side, instead of being burnt, is also a great menace; in fact cleanliness is one of the first principles, as in all pests, whether of the animal or vegetable kingdom. Dirty locks of wool, or any other matter attached to the wool about the hind quarters should be shorn off. The greatest danger from this pest is during the lambing season, marking and tailing, or when the sheep are suffering from diarrhœa or dysentery.

The Pastoralists' Review offers the following advice:—"The best and surest plan is to dip the whole of the sheep about six weeks after shearing, and as a supplement to this, to spray the ewes well over the tail and hind quarters about a month before lambing time, also at the same time to spray all ewe weaners. Besides being a preventative from the fly, the dipping makes the wool clean and bright, and thereby enhances its value."

Dalgety & Co., Ltd., quote the following from a letter received from Mr. John Broatch, manager of Quambone Station, New South Wales:—

"We dressed this season 20,000 lambs at marking with Cooper's Fluid for dressing lambs at marking; one gallon of fluid to 50 gallons of water. This applied with a mop to the tail and purse as soon as operated on has been most effectual, as during the last two seasons, on 42,000 marked lambs not one per 1,000 have been found affected by the fly; and we have further found that where the fluid is carefully applied, they bleed very little."

A correspondent writes to the Department as follows:—"As a preventative we dip our sheep with Cooper's Dip about March or April, using the strength of 125 gallons to the packet; this, if thoroughly done, and the mixture kept well stirred, leaves sufficient dip in the wool to destroy the young maggots when hatched. Should the sheep be struck by the flies after this, the best thing to do is to get a suitable vessel such as a tub and mix sufficient dip at the rate of 10 gallons to the lb. and submerge the hind parts of the sheep. But if the flock is likely to be all again attacked, which sometimes happens, a good plan is to put them through a race and either spray them or sprinkle them along the back with some Cooper's Dip. I have also found dusting them along the hind parts with a little dry powder very effective as a preventative. I should further caution as regards using dry powder when the skin is broken, as it sometimes causes death, but not so with dip used at its proper strength."

Another writes:—"Owing to the coolness and sometimes chilliness of the season, the trouble from blow-flies has been much less this season than last. I have found that the practice of dipping or spraying carefully at the proper times has proved an almost complete preventative of maggots."

Dipping about six weeks after shearing, when the wool is long enough to retain a considerable quantity of the dip, or better still, dipping in March while the weather is still warm and the ewe strong enough to stand it, appears to be an effective preventative.

Ewes lambing out of season and sheep suffering from diarrhœa have suffered most from fly; but by dagging and the application of a little turpentine, kerosene, or Cooper's Dip, very few sheep have died.

The following is a list of preparations recommended for the prevention of ill effects of flies and ticks:—

(*a.*) Arsenic (Paris Green), one and a half ounces, boiled in a bag in water and mixed with two ounces of tobacco boiled in water, and the two solutions mixed when cold to form one gallon, in which three ounces of bar soap in slices are dissolved by boiling the whole half an hour.

(*b.*) Tobacco water 10 gallons, Paris Green four ounces, soft soap half a pound, and asafœtida one ounce.

(*c.*) White lead 4 parts, Paris Green 1 part, sulphur 6 parts, cinnabar 2 parts, mixed.

(*d.*) Powdered white lead is a good remedy for maggots.

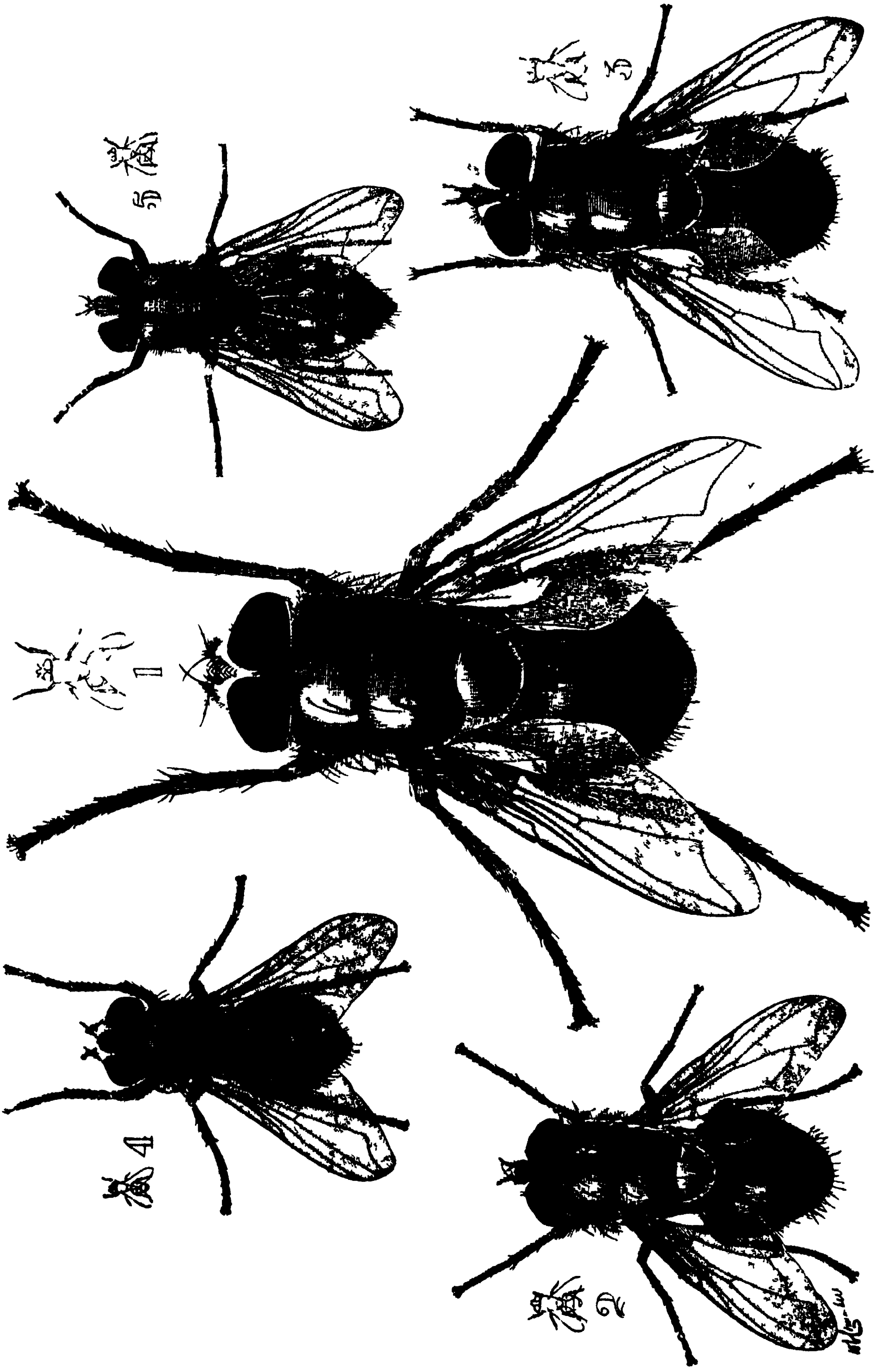
There are a number of dipping solutions on the market, with full directions how and when to use, which, if thoroughly done and at the proper times, will prevent the attacks of the fly.

Caution.—In dipping sheep in poisonous washes great care must be taken that none of the poison enters the stomach, as very little taken inwardly is fatal to the animal being treated, and this accident may easily take place if the animal, when in an excited state, dips its head under the solution; and again, if the pasture become contaminated with the sheep dip by the animals being turned out on the grass before they are dry, the surplus dip falling on the grass, which if eaten by any animal will prove fatal. Then, again, there may be some fodder in the drying yard which can become covered with arsenical solution, and in this way many sheep may be poisoned. There are many arguments in favour of using non-poisonous dips, but unfortunately they are often less effectual than the poisonous ones.

There is also danger of poisoning by washes containing carbolic, hellebore, and tobacco. In each case care must be taken that the animal dipped does not take any internally and that they are thoroughly dried before leaving the draining yard.

Note.—The recurring complaints which reach the Department from sheep owners respecting the trouble and losses caused by blow-flies in the autumn, more particularly amongst ewes, and the spring months, chiefly amongst lambs, have suggested the collating of these notes.

PLATE II



No. 1—*Lucilia tasmaniensis* No 2—*Lucilia caesar* No 3—*Lucilia sericata.* No 4—*Musca domestica.* No 5—*Musca corvina* —(*Agricultural Gazette*, New South Wales)

EXPORT OF FRUIT.

Owing to the difficulty experienced in past seasons in securing space for Western Australian growers for sending fruit to London, the Under Secretary for Agriculture requested Mr. Wicken to look into this matter and report thereon, and that officer has accordingly furnished the following report :—

"The charge for shipping fruit is 75s. per ton of 40 cubic feet. The charge is the same whether shipped in Hobart, Melbourne, Adelaide, or Fremantle. We are not likely to get any lower freights than this. Export cases measuring 20in. x 15in. x 10in. work out at 23 to the ton, or a cost of 3s. 3d. per case. It is the cost of case, handling, and so on, on a small consignment that makes up heavy charges ; if large consignments could be sent away these charges would no doubt be reduced. The principal difficulty in shipping fruit away from here is the question of securing space in the steamers. During the fruit season the mail steamers are able to fill up every inch of space available for the carriage of fruit before they leave Adelaide ; this space is booked for months ahead. Last year, about November, the P. & O. Co. made inquiries from everyone they thought likely to ship fruit from here as to their requirements this season. They got no response, consequently the space was given to growers in the other States, where fruit is shipped by large firms, who book space for so many thousand cases of fruit and take the risk of filling it. If at the present time of the year we guarantee to take certain space in any particular steamer, this space will be absolutely reserved, irrespective of requirements elsewhere; but, on the other hand, we have to pay for the space whether we use it or not. It would be unreasonable to expect the company to reserve the space for, say, 1,000 cases of fruit from this port, and the fruit not forthcoming, to have to go away with the space empty. As the best means of meeting the difficulty, I would suggest that this Department secure 50 tons of fruit space on, say, two boats for next season. This would be equivalent to two shipments of 1,150 cases, and the liability would be £187 10s. The fact that space was secured in these boats could be made public by means of the daily papers and the *Agricultural Journal*, and those wishing to forward fruit would be prepared to ship on those dates. The fruit could be handled, inspected, and possibly repacked at our fruit sheds at Fremantle. By this means space would be absolutely secured for those wishing to export fruit, and I do not think that the liability remaining would be very great. In the other States this work is done by private firms, but here, as we have no one prepared to go into this business, it would, perhaps, be better if, say for one year, the Department took the matter in hand.

"Another item of expenditure is the cost of export cases. This year we have paid an excessive price for the few export cases we have required. This is an excessive charge, and I would suggest that if we can entertain the idea of exporting fruit the Department call for tenders to supply the probable requirements of cases in shooks, as there is no reason why export cases should cost much more than those used for local trade."

The Under Secretary, in submitting this matter to the Minister, recommended that that the suggestions contained in the above report be carried out, and negotiations were accordingly opened up, and space has been secured by the boats leaving Fremantle on the following dates:—

R.M.S. "Orontes," March 2nd, 1908.
R.M.S. "Mooltan," March 9th, 1908.
R.M.S. "Ophir," March 16th, 1908.
R.M.S. "China," March 23rd, 1908.

for 25 tons of 40 feet on each boat, which is equal to 575 export cases of fruit on each boat. This space is therefore absolutely secured, and is available for local growers who may wish to send fruit home. The Department reserves the right of refusing varieties not suitable for export, or giving preference to the most suitable kinds grown for export. The fruit will, on arrival at Perth and Fremantle, be overhauled, repacked, and all "rejects" be sold on account of consignee. A small charge will be made for that purpose. Railway freight should be prepaid.

Those who propose to take advantage of this space are requested to send in full particulars of varieties, quantity, and the number of cases required, to the Under Secretary for Agriculture as early as it is possible to do so.

BEE NOTES.

By J. Sutton.

The present season has, in most cases, been a very severe and trying one for the bee-keepers, and goes to prove that those desiring to make bee-keeping a success must make themselves familiar with the subject, and having done so, must put their knowledge into practice. Much has been written, and also personal advice given, with respect to the attention needed more particularly during the early spring, when in normal seasons it were better to assist by feeding liberally to induce brood rearing. That I may make my observations as plain as I can on the present position, let me in as few words as I can do it say :

Each colony should have sufficient stores left at the end of the season to carry them safely through the winter months—June, July, and August—and preferably such stores should be sealed. During these months the bees generally cluster in some warm part of the hive, and very little of the stores are consumed. Then when spring arrives, and fine weather prevails, brood rearing begins, when stores nearest the brood nest are drawn upon, and providing weather is such that bees can fly, other necessities can be gathered, such as pollen, water, and nectar.

When unfavourable weather obtains, and the bees cannot fly, brood rearing must stop. Although there may be an abundance of sealed stores within reach, the nurse bees will not avail themselves of these stores, unless they have both pollen and water to use with the stores, hence not only must feed be given, but pollen also, so that every bee-keeper should have ready some feeder that can be used, of which there are several on the market that fill the bill, but those who have not got them may substitute the following :—

Take a kerosene tin and cut in half, fill this with black boy tops, or any rushes ; pour into this feeder some syrup made with sugar and water, half of each thoroughly mixed, place the tin feeder on top of the frames, putting an empty body—or super—over it, then cover, being careful that no robbers can by any means get access to it.

While other reasons may be given, I have no hesitation in stating that the present condition is the result of the continued wet and stormy weather, the bees are unable to get out, and the necessary food is not available within the hives to carry successfully forward brood rearing.

But says some one, there were plenty of sealed stores in the hives, yet they have died out. True, these stores may have kept the bees alive, but don't overlook the fact that but very few of the old bees that went into winter quarters will live longer than, say, end of September, and unless brood rearing may have been successful, the hives will have become very weak.

In the last two seasons much was written about the disappearance of some hundreds of colonies of bees in Victoria, for which no cause could be assigned Whether my theory be the correct one, or one amongst others, I feel safe in adding that had the matter been followed up by those concerned, this would have been one of the principal, if not the sole cause, of the losses in the Eastern State.

Numerous other causes may be assigned for the decrease, as the old bees that have come through the winter, unless they get a cleansing flight, often get what is termed "Spring Dwindling." This, I often think, should be called congestion, for after the long winter's rest they begin using the stores for feeding the young brood, and unless they can get out for a cleansing flight, they must suffer; hence, a few minutes sunshine, and some of the bees make a rush to get out, and are often caught in a storm, and being weakened, are not able to battle and get back again to their hives, and are lost.

Many colonies of bees that were fairly strong in September, after the severe cold and rainy weather, were found early in October to be very weak; their state was soon discovered by bees from stronger colonies, which commence to rob them of their stores ; others again, as soon as they can fly, attempt to migrate to some stronger colony, but not being welcomed are killed.

There is now no help for these, and the bee-keeper should make every effort to feed and stimulate those remaining by liberally feeding them until they are strong and in normal condition, and honey is available for them to gather.

Care should, however, be taken to see that where bees have left their hives and unmatured brood remains, that these frames containing dead brood be removed and destroyed, otherwise when hot weather prevails, this dead brood may ferment and give further trouble later by introducing some disease that may with difficulty be removed.

While many have given up their bees on account of previous seasons being poor, those who desire to continue should learn a lesson by the present season whereby they may be in a position, should we have smilar conditions another time, to give such attention as may be required wherewith to combat trouble and to prevent loss.

How to find the Queen.

To know if there is a queen in the hive, inspect the combs, and if no eggs or small larvæ are found in the bottom of the cells at this season of the year, you can reasonably expect that they are queenless, while, if the eggs are few and scattered about in different cells without regularity, the queen is unprolific.

To be absolutely sure that a colony is queenless, take a frame of comb having eggs and a little larvæ in it and put it in the centre of the supposed queenless colony, leaving it there for three or four days. If queenless, queen-cells will be formed over some of the little larvæ, while, if no such cells are started, rest assured that the bees have something they are cherishing as a queen, which makes it unsafe to try to introduce another until the thing they are cherishing is disposed of. To find such a queen carefully look over this frame of brood, for in nine cases out of 10 she will be on this frame. In fact, if I wish to find any queen that is not laying, I always put a frame of young brood into the hive containing such, leaving the hive further undisturbed for three or four hours, when, upon opening it again, this frame of brood is immediately lifted out, when., in nine cases out of 10, anything which the bees are keeping as a queen (and said queen is not laying) will be found on this frame of brood. This is the way to find out whether a colony has a queen. The started queen-cells will tell us that the colony is absolutely queenless, and if no cells are started, whatever they have and are keeping as a queen, can be found on this frame of brood we have given.

To the accustomed eye of the practical apiarist, prolific queens are easily found, especially if the bees are of the Italian race, but a virgin queen, or an apology for a queen, is often hard to find by an expert, and was, to me, a very worrying affair until I learned this "giving of brood trick."

In all of these operations, when looking for queens, the operator should always stand with the back to the sun, so that the eyes may be in the shade while the rays of the sun strike the bees and the "face" side of the comb when, if the eyes are at all sharp at queen-hunting, she will be quickly seen. No person can expect to find a queen readily with the sun shining in his or her eyes, when the face side of the comb on which we expect the queen will be in the shade; yet I have seen many would-be beekeepers looking for queens in just that way, and wondering why they could not find them. If the directions here given are followed out it should not be a great job to find any queen, whether fertile or unfertile.—Doolittle *American Bee Journal*.

THE ANGORA GOAT.

By Geo. H. Martin.

A great problem in Australia, as in most other young countries to-day, is "how to utilise the waste lands." For this purpose, writes Mr. Martin in *Dalgety's Review,* a suitable grass or fodder-plant must be found to make this poor land capable of carrying cattle, horses, and sheep ; or else recourse must be had to some useful animal capable of living in the rough conditions of the scrub country. We have this animal in the Angora. Not only will these goats live in much rougher conditions than any other domestic animal, but, from their habit of browsing, they reclaim the scrub and form grass lands capable of carrying less hardy domestic animals.

Upon the history of the Angora I do not propose spending much space. Their origin is really unknown, but they are mentioned in history back to 1600 B.C., and appear to be natives of Angora, a province of Turkey in Asia, where they have been bred and cultivated for centuries. What the sheep is to Australians, the Angora is—and more—to the Turks, providing them with food, clothing, milk, butter, cheese, and leather. Had the Turks been educated, enlightened business people, their favourite animal and its products would have developed a great industry centuries ago. However, it was left for that great Englishman, Sir Titus Salt, to show the world the beautiful, lustrous, silvery fleece of the Angora, and what could be made from it, which he did in about the year 1836. His discovery was partly accident, but mostly the result of a thinking brain, and necessity. The story will stand retelling. A South American firm consigned to England some 300 bales of hair, to test the market. None of the wool buyers would look at the strange material ; and the firm would have shipped it back again if they could have recovered expenses. Year after year these bales remained on hand, until Mr. Salt, becoming curious, took samples, and succeeded in inventing machinery to weave the strange hair. Keeping his secret carefully, he sought an interview with the principal partner of the consignees, Messrs. Hogan & Co., who turned pale when Mr. Salt asked how much he would take for the 300 bales. When he received a cheque, at the rate of 8d. per lb. (wool was then 3s. 6d. per lb.), for the whole consignment, he was convinced that he had done enough business for that day, and so shut up shop, and gave all hands a holiday. This curious hair was from the alpaca, or llama. Soon after appeared the beautiful lustre goods known as Alpaca, which became so fashionable that they made a millionaire and baronet of Mr. Salt, and increased the population of his manufacturing town, Bradford, from 30,000 inhabitants to 300,000. Trouble soon arose, owing to the shortage of supplies of raw material, and Sir Titus had to look for a substitute. He found it in Turkey—the hair of the Angora goat, called mohair. The popularity of Bradford goods continued until Turkey could no longer supply the demands. Sir Titus Salt was again on his mettle, but, as previously, was equal to the occasion. He introduced the Angora into Australia and South Africa, and it is at that stage that we become interested. Australia neglected her opportunities; Africa did not, and to-day she has some three million Angoras, and exports 11,000,000lb. of mohair and skins, valued at £750,000.

The question naturally arises, why did Africa succeed and Australia fail? The answer would seem to be, that Australia is probably the greatest sheep country in the world, and she had at that time plenty of the right country for sheep breeding—country which has since been taken up, leaving, however, vast areas of goat country. A second answer to the question would appear to be that, on the first introduction of the Angora, its real value was neither appreciated nor understood; and no one thought apparently of turning the destructive or browsing habits of the Angora to profitable use. This discovery or idea was left to a cute American, Dr. Standley, of Iowa, U.S.A., who was the first man to realise that the Angora's browsing habits could be utilised in clearing land. Since the discovery the industry has gone ahead in America with great rapidity, and Africa will soon have a powerful rival for supremacy. The fact that it does not appear to have been known that the Angora could be crossed with the common goat, and the breed built up, no doubt also militated against the introduction of the Angora into Australia in former times. When the various capacities of the species are all taken into consideration. it cannot but be recognised that the Angora is a most profitable and desirable animal for Australia. And as we are a practical people, well versed in animal culture, we should be able to improve upon what others have done, and make the Angora still more useful than we find it to-day.

First Australian Importations.

I have, therefore, no hesitation in predicting that the Angora is here to stay, and will be made very welcome. This being so, the next question is, how to make a start? And here we find that we are immediately faced with a difficulty. Before considering this, however, I shall give a short history of what has been done in Australia, from a paper written by the late Sir Samuel Wilson :—"In the year 1856 the first importation of Angora goats into Victoria was successfully accomplished. They were seven in number, being survivors of a large number shipped. Mr. Sechel, a merchant of Melbourne, had heard of their successful introduction at the Cape Colony, and learning that they had increased and thriven well in that climate, he determined to introduce them into Australia. After considerable difficulties, a small flock was secured by an agent at Broussa, near Trebizond, which was shipped by way of Constantinople to London, where the goats were transferred to a vessel sailing for Port Phillip. Soon after their arrival they were purchased by Baron von Mueller for the Zoological Committee, and afterwards transferred to the Acclimatisation Society. In 1863 this society in return for some specimens of fauna of Australia, including a wombat, was presented by the Imperial Acclimatisation Society of France with 12 pure-bred Angoras of a very high class. These arrived safely, and were added to the flock at the society's grounds at the Royal Park. The flock was too small, however, to be of much practical use to the colony, and soon after the Acclimatisation Society took the matter warmly in hand, and Dr. Black, the president at that time, by his energy and perseverance succeeded in inducing the Council to vote the sum of £600 towards the cost and expense of importing a sufficient number to establish the breed in the colony within a reasonable time. Mr. McCullough, of Maryborough, a gentleman who had taken a great interest in the introduction of both Cashmere and Angora goats, added a like amount of £600 for the purchase of a number on his own account. In 1865 a special agent, who was acquainted with the qualities of the Angora, was sent by Mr. Philpott, who acted as agent in London for the Acclimatisation Society, to Asia Minor, to select and purchase as many pure Angoras as the funds at command would permit. The goats were obtained in the neighbourhood of Broussa, and were driven to the port of Smyrna for shipment. Before their embarkation at Smyrna, the cholera broke out at that port and caused great delay, besides adding considerably to the cost of the undertaking. Ultimately the goats were landed in London, and reshipped for Melbourne, where they arrived early in the year 1866, after a tedious passage of 127 days, with a loss of only two on the voyage. Mr. McCullough sold his moiety of the flock to the Acclimatisation Society, the number landed being 93 in all, costing the society an average of about £16 per head. It will thus be seen that the introduction of the Angora goat into Victoria was mainly due to the exertions of the Acclimatisation Society." Further importations were made from Asia Minor, by Mr. Price Maurice, into South Australia. From these importations the goats were bred and distributed to many settlers in Victoria, New South Wales, South Australia, and Queensland. They seem to have prospered and multiplied, but were little understood, and many of their virtues remained undiscovered. In South Australia they have been kept on scientific lines by Mr. Scammell ; and the late Mr. E. C. Kempe, in conjunction with Mr. Sydney Kidman, made a great success of their flocks in Central Australia. Mr. Kempe was an enthusiastic admirer of the Angora, and made it a business to let others know also of their virtues. At his death, the flock of 1,300 was sold by auction, in Adelaide, in May, 1906. In New South Wales for the past ten years, Mr. Rex Blaxland has ably championed their cause, and to him, in a great measure, the present strong interest now being manifested is due.

Building up a Flock.

Our first difficulty is that pure-bred, or even full-blood, Angoras are scarce and expensive, so that we must hasten slowly, and following the lead of other countries, grade-up on the common nanny. In the first place, it is now impossible to import from Turkey, as the Sultan has decreed that it is a capital offence to export Angoras. This may be a case of shutting the stable door when the horse has gone; but it is a fact nevertheless. If we turn to South Africa, we meet with another check, as no animal from that country is admitted to Australia, on account of the rinderpest ; besides which, South Africa has placed an export duty of £100 per head on Angoras, which is conclusive evidence of the importance which they attach to the industry. Then we turn to America, this time with better success. Here, also, export duty is talked of, although not a prohibitive one ; still, with cost, freight, and quarantine expenses, the price becomes high. We are therefore forced to make the most of what stock we have in Australia, some of which is good enough for a basis upon which to build up. With this stock, we must do by scientific breeding what we have done with the merino, in the case of which the clip has been raised from about 3½lb. of Captain McArthur's importation to, say, 30lbs. to 40lbs. of our present-day champion rams. This can be repeated with the Angora.

To make a start it is necessary to procure a good buck, as many pure does as means will allow, and as many common nannies as the area will carry, and grade up. In this way the great flocks of South Africa and America have been produced.

In procuring common nannies for grading, it is advisable to get them young and as clean skinned as possible; long hair on back and legs is objectionable. The better the buck used for cross-breeding the more rapid the progress; if the buck has quality, it is remarkable how he will stamp his progeny. The third and fourth crosses are hardly distinguishable from pure-breds, except to the expert; but the shears and scales tell a different tale. The result in figures is about as follows:—

1st cross, or half-bred.—Does not pay to shear.

2nd cross, or three-quarter-bred.—Will shear about 1lb. to 1½lb., at 8d.

3rd cross, or seven-eighths-bred.—Will shear about 2lb. to 3lb., at 10d. to 1s.

4th cross, or fifteen-sixteenths-bred.—Will shear about 3½lb. to 4lb., at 1s. to 1s. 2d.

5th cross, or full-blood.—Will shear about 4lb. to 6lb., at 1s. to 1s. 4d.

It then becomes a matter of selection and improvement, up to a point when a clip of 10lb. or even 18lb. may be produced, to average 4s. per lb.—and this should be the goal of the breeder. The introduction of the common blood increases the stamina of the progeny, and it is therefore safe to breed with the same buck upon his own daughters. This will increase the rate of progress. With the third generation, it will be necessary to change the buck, always endeavouring to have as good quality as possible.

The young crossbred buck kids should be castrated, in the same way as ram lambs, when a few weeks old; and if fattened and killed at, say, four to twelve months, they are excellent eating, and the skins make beautiful mats or rugs.

Shearing may be done by hand, or, better, by machine, care being taken to avoid "second cuts," since short mohair is much less valuable than long. In Australia, it is advisable to shear but once a year, viz., when the winter is over and before the fleece starts to shed; if allowed to shed the mohair loses its lustre.

In Australia, at present it is advisable just to roll the fleeces separately, and not attempt to sort. Mohair is made into many classes, and the necessary knowledge of the classes is lacking here. Neither is it advisable to scour; it is almost impossible to sort scoured hair into grades.

The Angora's "crowning glory is his hair." The fleece of the Angora is called "mohair," and is hair, not wool, for the fibres are straight and solid, whereas wool is serrated and hollow. While to-day the Angora will shear per head much less weight of mohair than merino sheep will shear wool, the yield is much better, owing to mohair being free from grease. About an average yield for mohair is, say, 80 per cent., against wool 40 to 50 per cent. The present day demand is for "ringlet" (or curly) mohair. The colour is most invariably white, and should have a bright lustre, great tensile strength, and not be less than seven inches long for twelve months' growth.

Prices, Uses and Production.

The range of values is somewhat extensive. Short, faulty mohair, with a large percentage of kemp, would be worth about 8d. per lb.; best Turkey or Cape, 1s. 4d. to 1s. 9d. for choice hair; while Mr. L. Levussore, of 152

Third Avenue, New York, constantly advertises that he will pay for long mohair one dollar to five dollars per lb. Some New South Wales mohair has been sold to this firm at 4s. 2d. per lb., and it is to be hoped that the limit of five dollars per lb. will be reached in the near future. A London firm advertises mohair for sale at 6s. per oz. Thus it will be apparent that long mohair has a special value to the manufacturer.

The most striking feature of mohair goods is the beautiful lustre, which is apparent while on the Angora, and is retained after all the processes of manufacturing and dyeing have been passed through. Mohair takes the dyes and retains the colours permanently. The next leading virtue is extreme strength, for it is two and a-half times stronger than wool ; and lastly, there is its great durability. It enters so largely into commerce that a full list of uses is here impossible, but they include plushes (railway and furniture), ladies' lustre dress materials (including the motor coat), and dolls' hair and wig-making consumes no mean quantity. During the past season mohair neckties have been very fashionable. Mohair braids are greatly valued, and extensively used in Europe, especially by Russia. The alpaca goods are chiefly of mohair, such as the lustre office and house coat.

At present South Africa takes the lead in production, with 11,000,000 lb. ; Angora comes next, with 10,000,000 lb. ; America third, with over 1,000,000 lb. ; thus the world's production is over 22,000,000 lb., of all grades. Of this quantity, Bradford, in England, handles about 80 per cent., and she is therefore easily the hub of the mohair trade. America uses up all her own production, and imports an additional quantity. Australia's contribution to the world's supply is hardly worth figuring. Still, it is on the increase, and the near future promises that it will be quite an item in our exports.

Angora Flesh, etc.

If the Angora is fattened on grass, and if killed young (say from four to 30 months), the meat is most palatable, and passes for best lamb or mutton. If fed on rough scrub, the flesh has a gamy, juicy flavour, like venison. In America large quantities of Angora wethers, pure bred and grades, are slaughtered and sold as mutton. In Australia, a public prejudice exists against goat meat, mainly because the superior article—the flesh of the Angora—has not been available. One New South Wales butcher, who breeds a few Angoras, informed me that he has for years put all the wethers through his shop as mutton, and has never received a complaint, but many times customers have referred to the " nice mutton " he has sent them. In one fairly large town in New South Wales the inhabitants depend upon the goat for meat. Mr. Kempe used to sell large quantities of goat meat to the miners of Central Australia, and gave it preference to mutton. That this prejudice exists cannot but be regretted, as it is the outcome of ignorance. No animal is more cleanly in its habits than the Angora. The food must be clean : if a gumleaf, it must be a clean gumleaf, it must not be defiled by the hand of man. In addition to this, the Angora is the most healthy domestic animal known, tuberculosis being almost unheard of amongst them. The bones of the Angora do not ossify or harden till in the second year ; therefore a kid is a kid longer than a lamb is a lamb. The flesh of the pig and duck is accepted by the average man as good, clean food ; yet these animals love to wallow in filth and dirt, and they will eat the most putrid, offensive food that comes before them. The task set the Angora breeder is to break down this prejudice against goat meat. It will be readily done when well fed, choice, young meat is offered to the public.

The milk of the Angora, like that of other goats, is very rich and easily digested. It contains as much as 8 per cent. of butter fat, compared with 3 to 4 per cent. in ordinary cow milk, and therefore only about half the quantity is required. The goats being particularly healthy and cleanly animals, and tuberculosis almost unknown amongst them, theirs is the safest milk to use. The Angora is seldom cultivated as a milker ; but I have known grade Angoras, when well fed, to give three quarts per day. However, it is rather much to ask an animal to produce large quantities of mohair and milk at the same time. The one essential requisite for milk production is good food. Although they may exist for years on scrub and grow good mohair, they cannot produce milk when fed on this rough diet. Goat's milk is particularly valuable for children and invalids ; the casein is in large supply, and the fat contained in the milk favours a heavy yield of butter, which is white in colour. The milk contains up to 90 per cent. of casein, and therefore makes a high percentage of cheese, which is much prized throughout Europe and Asia.

To-day the world is rapidly running short of furs. The buffalo, or bison, of America, has gone ; the bear, tiger, and lion are becoming scarce ; our own marsupials are rapidly disappearing ; and so also are all other wild animals. It is therefore necessary to find a domestic animal to fill the gap. The Angora has certainly proved the most suitable. According to the time allowed for the fleece to grow after shearing, the Angora skins can be and are made to imitate those of most wild animals. The astrachan is simply curly-haired Angora skin. Floor-rugs, carriage and motor car mats, bed and travelling rugs, ladies' muffs and neck furs, may be made of Angora skins, and look very beautiful ; they may be dyed any colour, and almost are everlasting. The skin should be carefully taken off and dried in the shade, not in the sun.

Angora skins do not make as good boot leather as that of the common goat, since the texture is finer, more open, and porous. However, it is very suitable for gloves and fancy book leathers.

Breeding.

High-class stud breeding requires considerable knowledge and attention, coupled with natural ability ; but for general flock purposes, only a few points are necessary. It is advisable to breed so that the kids come in the spring and autumn, thus avoiding extreme heat and cold ; and at these two seasons young succulent grass is usually plentiful. The period of gestation is about five months, as with sheep ; so that the bucks should be placed with the does during April and November. The bucks should be kept in the best possible condition, especially at rutting time. The does should be at least 10 months old before breeding, the bucks about the same ; one buck to 40 or 50 does. While the common nanny frequently has two or three kids, the pure-bred Angora doe seldom has more than one.

One disadvantage of the Angora is that the kids are weakly at birth, and remain so for about three to four days ; the does are not as good mothers as sheep, and therefore special care is necessary at first, the mother requiring good milk-producing food. It is advisable to have a small yard or paddock, and when the does are due to kid they should be placed in this paddock, and not allowed with the flock until the kids are about four weeks old. I have found that although dry does, bucks, and wethers can exist, and grow mohair, entirely on rough scrub, the does cannot rear kids with this treatment ; in fact, they will not try, and knowing that they have no milk for the little one, they will abandon it. Some grass or milk-producing food is therefore essential.

Scrub Clearing.

To this question I have given considerable attention, for I consider it one of the chief recommendations of the Angora in Australia. They will undoubtedly clear land of the worst weeds, scrubs and pests known. Goats are naturally browsers, and even when in rich grass up to their knees they will consume considerable quantities of leaves and weeds, if available. Blackberry, sweetbriar, lantana, and Paddy's lucerne are "strawberries and cream" to a goat, and they are no longer "boss pests," but may be cleared by the goats, with intelligent working. If these pests have gained a strong hold, it will be necessary first to cut them down, and then turn in the goats, who will eat off all the young shoots as they appear above ground. After a couple of years of this treatment the roots will die, and the trouble is ended.

Almost all our native bushes can be cleared with the goat. They have a special liking for wattle, hickory, wild cherry, blackthorn, ironbark, and box, and will keep the leaves eaten off, so that the plant thereby loses its lungs, and dies right down to the root.

After ringbarking or cutting down timber, a thick fringe of suckers usually appears. If Angoras are turned in they will readily bite off the young shoots as they appear, and the tree or stump dies in consequence. During the process of scrubbing, the goats are growing mohair, but the quality will probably be lower than if fed on good grass ; therefore, it is advisable to change them from scrub to grass, and *vice versa.* While the process of scrubbing is proceeding, the goats are fertilising the ground, and grass will rapidly follow.

Continually living on Australian scrub is not good for the goats ; they need a change to grass, or their digestive organs become impaired. If the scrub is thick, at least six goats to the acre will be necessary to make any impression. When they have eaten the leaves off they can be spelled till fresh leaves appear, when they should return to the attack. Some farmers turn in pigs to root up the ground, and then sow grass seeds. Pigs should not be placed with goats when young kids are about, as pigs have no prejudice against goat-meat, and will eat the kids.

At Wentworthville, scrub-clearing with goats proved a great success. At first, 25 acres were fenced and wire-netted, and the goats set to work, and in a few months land that one could hardly walk through for blackthorn was cleared. The grass is now progressing wonderfully ; and I have also tried them on lantana and Paddy's lucerne with equal success. Mr. T. G. Phelts, of Holdsworthy, near Liverpool, had an obstinate patch of blackberries, which he could not eradicate till he put on Angoras. In New Zealand, also, goats are being used for eradicating blackberries. What a vast area of Australian land is worthless because too poor to be worth the heavy expense of clearing and keeping clear ! With the Angora at hand to do the work for less than nothing, this land immediately assumes a value, the benefit of which falls into the public purse.

The droppings from goats are quite as valuable as those from sheep, and are evenly distributed during the day upon the pasture. The money value per ton of this manure is about 27s., against 6s. 11d. for horse or cow manure. My experience has been that the land fertilised by the goat will carry splendid grass and stand a dry spell admirably. A thousand goats will probably distribute as much as two to four tons of manure per week ; and the first rain that comes will dissolve it and send it into the soil.

At present in New South Wales no law exists for branding or ear-marking goats ; therefore, owners are at liberty to use whatever brand, or ear-mark they choose.

The age of Angoras may be read the same as with sheep : two-tooth, one year ; four-tooth, two years ; six-tooth, three years ; eight-tooth, four years and over. The average life is about nine years, but I have known them to live for 20 years.

The goat tribe are noted for their enterprise and ability to get where they want to, which makes fencing an important question. Wire-netting is undoubtedly the best. It may be used with wide mesh, but stout gauge ; two feet high is ample if a barbed-wire is placed at bottom and five inches above. Goats are not jumpers, but climbers, and if a post or stake is left leaning against the fence they will soon be over. Alternate plain and barbed-wire, five inches apart, will secure goats. Mr. Blaxland, at Murinbin, has found that a nine-wire skeleton fence, made according to the following specification, was a success :—Posts, 14 feet apart ; one wooden dropper between; wires, spaced two, four, five, six, seven, eight, nine inches apart ; No. 10 or No. 8 black wire can be used. Cost, £28 per mile.

Angora v. Sheep.

Angora breeders are continually asked—Will goats pay better than sheep ? To those who are running sheep on sheep lands, I would answer in the negative. Australia has undoubtedly been proved to be a great sheep country—possibly the greatest in the world—and it would be a brave man who attempted to induce flock-masters to exchange their sheep for any other animal. However, one should be sure that the country is sheep country, or in a fit state for sheep. No sane man would have put sheep on my farm at Wentworthville, in the condition it was in when the goats were tried ; but they have so cleared the scrub, and the grass has followed so well, that I have put Shropshire sheep on the land cleared by the goats, and they are doing splendidly. Mr. Blaxland has done the same near Singleton. I have watched hungry sheep and goats turned on to grass land with patches of Paddy's lucerne. The goats went straight for the latter, and the sheep to the grass; this would indicate that on this land more goats than sheep could be run to the acre. Then, again, in some parts it would take 20 acres to feed one sheep, yet this land would carry one or two goats to the acre. The great advantage that the Angora has over sheep is that goats are great drought resisters, and therefore a safer investment in dry areas. Another great advantage is in the scrub-clearing properties. I frequently read in the valuable "Soil" column of the *Daily Telegraph* that cattle and sheep will clear scrub. We know that in times of drought sheep will eat scrub ; but do they prosper on it ? No ; the reduction of numbers by millions during the last drought is conclusive proof of this. On the other hand, Mr. Sydney Kidman, the cattle king of Central Australia, informed me that during the 1902 drought, 1,000 head of his Angoras pulled through without loss, while 13,000 out of 14,000 head of cattle died. This flock was raised to the north of Lake Eyre, where 3½ inches is the average rainfall. As the Angora lends itself so wonderfully to scientific breeding, and as Australians are so well versed in the art of animal culture, and are assisted by a country without a superior for the purpose, it is more than likely that the writer who takes up the comparison a few years hence will be able to give such figures as to weight and value of the annual clip, and the popularity of the meat—not forgetting the improvement to the farm—that our sterling friend of the golden fleece will have a difficult task to show better dividends than our friend of the silver fleece. Australia grows the best wool in the world : why not the best mohair ?

The general belief is that the Angora is immune from disease. Unfortunately, this is not so ; but at the same time, they are subject to far fewer ailments than other domestic animals. Diarrhœa is caused by certain scrub they eat, by young grass, and, in some cases, by acute indigestion. If taken in time they soon recover ; if neglected, they will die. The first business is to change the diet and feed on dry food. The goats are often subject to lice, which may be cured by dipping with almost any of the ordinary sheep dips. This is best accomplished just after shearing. Lice will not kill goats, but they make the animal scratch the hair off. Stomach worms sometimes affect goats, and will keep the animals poor. Turpentine will often effect a cure, also the well-known arsenic remedy as used for sheep.

Note.—Attention is directed to the advertisement in this issue of the *Journal* of a few two-tooth pure bred angora bucks for sale at the Narrogin Sate Farm.

THE MOHAIR INDUSTRY.

An interesting interview was recently published in the *Morning Herald* as having taken place between a representative of that paper and Mr. J. D Rankin, of Parker's Road, Southern Cross, on the subject of breeding Angora goats and the production of mohair. Mr. Rankin, it transpired, has been closely associated with the pastoral industry all his life, having at one time been manager of the Warrayure Station, near Hamilton, in the Western District of Victoria, and since then engaged in pastoral pursuits in the Riverina district. He is now owner of a gold mine known as Mount Rankin, but as his visit related to the mohair industry and the striking out of the item from the Bounties Bill by the Federal Senate, mining matters may be discarded for the present.

Mr. Rankin explained that he had intended, while visiting the metropolis, to make out a claim under the Bounties Bill, and expressed regret at the action of the Senate, as he considered that the inclusion of the item was an important matter to this State. He had a large tract of country at Parker's road, a small station 14 miles on the Perth side of Southern Cross. Some five years ago Mr. Rankin had 140 common goats and two Angora bucks, which he imported from South Australia, and he then secured four more from the same State. With these six stud bucks he entered upon the breeding of Angoras for the mohair. He found that the animals of the first cross did not give any hair, but that from the second cross there was a great improvement, and a very fair quality was obtained on the third. At the fourth cross the "sheep" were almost pure-bred and gave an excellent quality of mohair of good commercial value. He has now 700 of these animals of the second to fourth cross, and hopes to establish the industry on a sound basis, stating that if he can do so it will be a big thing for this State.

Mr. Rankin stated there was a prejudice against Angoras because people did not understand them. For instance, owners who had one or two for crossing purposes complained that they shed their hair in hot weather, but that was due to faulty management. He found that the animals required shearing twice a year—January and at the end of July or beginning of August; if that were not done they would shed their coats, and the hair would be lost.

The Angoras, Mr. Rankin further explained, will do well in country that is too poor to carry any other class of stock, provided water is obtainable. They must have water, but they will thrive on the poorest herbage or mulga and are more discriminating than sheep in country where there are any poisonous plants. Those they leave severely alone. The Angora, he continued, is like the sheep, and the ewes breed once a year, having generally one lamb, but sometimes two. In their habits they resemble the sheep, and not the goat. In breeding from common goats he had noticed that the habits of this animal were steadily eliminated, and that at the third or fourth cross the Angora characteristics became normal. The Angora then resumed its nomadic habits, and would wander over a great area, showing an increasing disposition to remain away from home. They would, however, always return to the source of their water supply. Mr. Rankin also stated that he has sheep and Angoras running on the same station, and he has not discovered any tendency to interbreed; but what struck him was that while the sheep required shepherding in the poison country, it was not necessary in the case of Angoras. He found the sand plains and scrub the most suitable feeding grounds for the Angoras, which are very hardy, and thrive in the Southern Cross country.

Reference having been made to the area of country similar to that around Southern Cross, Mr. Rankin said:—"The Government has millions of acres, of unalienated Crown lands, which, with some encouragement, could be devoted to raising Angoras, and thus building up a valuable mohair industry. Look at what has been done in the dry districts of South Australia, and you will realise the value of this. Now wild dogs breed on these unoccupied Crown lands, and they come to our holdings and injure our flocks. We have to kill the dogs at our own expense, but if the Government paid a bonus of so much per head there would be some encouragement to go on with the work. As our flocks multiply food becomes more plentiful, and the dogs increase more rapidly, so that it is a matter in which the Government may be fairly asked to do something. In connection with this matter, the Government has an opportunity of doing something to get the people on to the land, and to building up an industry that would add materially to the wealth of the State."

Mr. Rankin sold some mohair locally last year, but he is sending a bale of the best quality to London to test the market. He has no hesitation in saying that the finest mohair can be grown on our goldfield areas, and hopes to see some official recognition made of the possibilities of the industry.

DEGENERATION IN POTATOES.

During the past few years many inquiries have been addressed to the Royal Botanic Gardens, Kew, as to the reason why potato tubers fail to form sprouts at the proper season, even when placed under the most favourable conditions for doing so. Last spring one correspondent stated that out of 70 tons of potatoes of high grade, specially intended for "seed," only five tons showed signs of sprouting, the remainder being disposed of, at a serious loss, for culinary purposes. This condition of things is not confined to this country. In Germany serious losses have been sustained owing to the sterility of potato "sets," more especially of the kind known as *Magnum Bonum.* Very few of the eyes produced sprouts, and the "sets" at the time of lifting were not shrivelled and dried up as is the case under normal conditions, but on the other hand were solid and quite firm and in many cases had actually increased in size. In one instance where the "sets" were graded by a machine before planting, an increase in size of from one-half to three-quarters had taken place. This proves that the "sets" after planting had commenced growth a second season, and had accumulated the starch formed by the scanty amount of foliage produced. The new tubers formed by such plants were small and few in number. In many instances sprouts were not formed, and the "sets" remained intact in the soil throughout the season. The loss on the potato crop varied from about 5 per cent. to total loss, and averaged from 50 to 60 per cent. Investigations made by Dr. Schleh and Dr. Speikermann proved the absence of any specific disease, and the failure was in part attributed to the practice of growing the same kind of potato from sets produced on the spot for a long period of time.

In France Dr. Delacroix has described the occurrence, on a large scale, of a similar sterility of potato tubers, which he calls "filosité." In this case the few sprouts produced become considerably elongated, remain very slender, and usually do not appear above ground, and when they do so, produce only a few small stunted leaves. Here again there was an absence of disease, and the author considers that "filosité" is due to decadence and loss of vitality, brought about by the employment of the vegetative method of reproduction invariably followed. In those countries where attention is paid to the production of improved varieties of potatoes, certain points have been constantly kept in view. Amongst such may be enumerated: increase of crop; improved flavour; smooth and even surface; immunity from disease. With the first three points cultivators have surpassed their most sanguine expectations, and it is to be hoped that by a strict application of Mendelian laws, a strain of potatoes immune to all ills will shortly be forthcoming.

Unfortunately the method of selection and the lines followed in producing these much desired improvements in potatoes have in some instances also favoured other unexpected modifications, which have resulted in sterility or failure to form sprouts by the tubers. This failure has been shown, by a series of experiments conducted at Kew and extending over three years, to be accompanied by a combination of two distinct specific conditions: (i.) more or less arrest of the development of the vascular system of the tuber; (ii.) comparative absence of the ferment or enzyme called diastase from the tuber.

A tuber, as is well known, is the very much swollen terminal portion of an underground branch specialised for the purpose of a vegetative method of reproduction. Such tubers retain, under normal conditions, those structures present in the above-ground system of a potato plant. The main bulk of a tuber consists of a mass of tissue crowded with starch, which is used up in the formation of new shoots or sprouts. This starch is conveyed to the growing shoots through certain portions of the fibro-vascular system, which appears to the naked eye when a tuber is cut across, as a thin line forming a ring situated some little distance from the surface of the tuber. Branches from this ring pass outwards to the "eyes" or sunken points from which the sprouts originate. Now the improvement in the tubers, from the culinary standpoint, which has resulted from these methods of selection and inter-breeding, has at the same time been accompanied by a serious degeneration of the fibro-vascular system ; in fact, in many examples that have been examined microscopically this system is found to be so much reduced, especially in the branches connecting the main ring with the "eyes," as to be rendered incapable of conveying the necessary amount of food from the tuber to the growing shoots. Consequently the growing shoots are either not developed at all, or only developed as weakly branches devoid of vigour and soon perishing. It is a well-known fact that a quarter of a century ago, stored potatoes (even the varieties most renowned for their "mealy" or "floury" qualities) were apt to become sweet in flavour, watery, and unsuitable for table purposes during the early spring months. Various methods of treatment were devised for preventing deterioration from a culinary standpoint, more especially in the case of potatoes stored on board ship for use during the prolonged voyages of that period. This defect is not apparent at the present day, and many of the best kinds remain unchanged in composition until midsummer or even for a longer period of time.

The primary object of the mass of starch stored up in a tuber is that of supplying formative material for the shoots during their early period of growth until the leaves are developed. Before the starch can be utilised, however, it has to be converted into a liquid condition, when it is conducted through the elements of the fibro-vascular bundles to the growing points. The solution of the starch is effected by means of a soluble ferment called diastase, which is produced in the tuber when the normal season for growth or sprouting arrives. Now in many high-grade potatoes at the present day, diastase is produced in such small quantity that it is incapable of converting more than a very small proportion of the starch present into liquid sugar, hence the absence of sprouting is due to a lack of food material, necessary for the work. For the same reason many tubers remain almost unchanged as to starch contents when the crop is lifted in the autumn. These are illustrations of somewhat extreme cases, but the fact that the potatoes in general remain "floury" for a longer period of time than formerly, indicates a gradual and general loss of power on the part of the potatoes to produce the necessary quantity of diastase.

A total absence of diastase was proved in the case of tubers that had failed to sprout. In other examples the relative amount of diastase present was ascertained to be in proportion to the number of sprouts formed.

Diastase is formed, and in greatest abundance, at the apical or free end of a tuber, and for this reason the earliest and most vigorous sprouts are produced in this region in a normal tuber. When the presence of diastase is on the wane it also lingers longest in the apical region ; hence, in a large percentage of deteriorating tubers, sprouts from a single apical "eye" are alone produced, and in many instances, where the supply of food is very scanty owing to the absence of diastase, these sprouts perish at a very early age—the power of growing or sprouting has been completely lost, owing to the deterioration of the fibro-vascular system and the comparative absence of diastase.

During the past three years a series of experiments have been conducted with the object of imparting new vigour to potatoes intended for "seed." It must be admitted that the results obtained up to the present have not been very encouraging, the time being too short to remove the deterioration which it has taken a prolonged period of more or less intensive cultivation to establish; nevertheless certain points have been noted which may prove to be of value to future experimenters.

Degeneration appears to be mainly due to the vegetative method of reproduction commonly followed. Even in the case of seedlings, the parents of these must at least be closely related.

The nearest approach to a return to normal conditions is in the case of potatoes that have been grown for three years in succession on the same patch of sandy ground and without a trace of manure of any kind. The original "sets" of a highly prized modern type were each reduced to the condition of only being able to produce one sprout at the apical end. The product of the third generation formed vigorous sprouts from every part of the tuber, thus proving that abandonment of all forcing or selective tactics enables the plants to regain their power of producing diastase. This result, however, was at the expense of all those points that have cost the cultivator so much time and labour to secure ; the crop was small, the tubers few in number and only of average size, the "eyes" considerably depressed.

Superphosphates increased the amount of diastase to a much greater extent than a liberal dressing of farmyard manure.

Light favours the production of diastase much more than darkness, while a greater amount is produced in a high than in a low temperature.

A very interesting discovery on this point was made by Mr. Watson, Curator of the Royal Botanic Gardens. Some tubers that had refused to produce sprouts when placed under the most favourable conditions available to the ordinary grower, were placed in one of the forcing pits having a temperature averaging about 70deg. F. In due course sprouts were formed in all the "eyes" at the apical end of the tubers. The tubers were then planted and yielded an ample crop of normal potatoes.

POTATO TRIALS.

By Wm. Cuthbertson.

If potato experiments are to be of much value they must be carried on for several years and the seed tubers of the different varieties planted must be all grown under the same conditions. These are the lines on which the Edinburgh and East of Scotland College of Agriculture has been working for a number of years. On Saturday, September 5, the final inspection for the season took place, when the second early and late varieties were inspected. There was a large and representative gathering of well-known agriculturists and a few prominent horticulturists. Mr. William Bruce, Director of County Work, conducted the party, there being also present Mr. James Wyllie, of Cockburnspath, convener of the County Work Committee and one of the directors of the college. The experiments embraced 70 plots, which had been planted to test the cropping qualities of the various varieties, the effects of spraying, artificial manuring, cut sets versus whole sets, and planting at different distances apart. A rather hurried inspection was made of a number of cooked dishes of tubers of the different sorts, but Mr. Bruce did not seem to attach much value to the results, as he thought such work would be much better done in the college buildings under better conditions and when more time could be given to it. The following is the official statement respecting the conditions under which the trials were made :—

" The potatoes are grown in the ordinary course of the rotation on Pinkie Hill Farm, near Edinburgh, and the cultural treatment was the same as given to the farmer's crop.

Manuring for variety trials.—30 tons of short stable and byre dung, ploughed in during the winter ; 6cwt. of a special potato manure. Analysis: —Amm., 4 to 5 per cent.; phosphate, 20 to 22 per cent.; sulp. potash, 10 to to 11 per cent. In order to secure uniformity the land was ridged and manure sown with a double-drill and manure-distributing machine.

I suggested to Mr. Bruce that his dressing of farmyard manure was abnormal. His answer was that it was not of particularly good quality.

Seed.—The seed was grown on last year's trial plots, which were in the adjoining field. It was all carefully selected, counted, and weighed by the college staff. The seed was planted at the rate of 20cwt. per acre, or 56lb. per full plot. The same number of sets was placed in each drill, which is exactly 1 pole, a full plot being 4 drills, or 1-40 acre. Most of the varieties have now been on trial for three years."

The produce of each plot was sorted out and placed on the ground in potato boxes for the visitors to inspect. The ware was dressed over 1⅞in. riddle, the seed over 1¼in. ; what passed through 1¼in. was classed as chats, all diseased tubers being picked out as the dressing was done and placed by themselves.

II.—Experiment with Second Early Varieties (100 sets, 14 inches apart per drill).

—	Yield in pounds on 8 poles.				Total per acre.		
	Ware.	Seed.	Chats.	Dis'd.	tons.	cwt.	lbs.
(9) British Queen	201	144	15	40	9	10	53
(8) Dalmany Radium	231	147	23	40	10	10	0
(11) Maid of Coil	240	83	71	12	9	11	101
(3) Johnston's Diamond	278	81	111	18	11	10	0
(13) Crofter	195	72	64	16	8	5	80
(12) Russet Queen	165	162	21	39	9	4	32
(5) Evergood	249	189	—	42	11	8	64
(14) Eldorado	126	75	—	25	5	7	96
(9) British Queen (duplicate plot)	230	158	8	28	10	1	101
(8) Dalmeny Radium (duplicate plot)	224	137	11	36	9	14	32
(4) Moneymaker	296	149	—	36	11	9	5
(7) Royal Kidney	264	126	—	39	10	4	32
(6) Dalmeny Acme	245	148	—	46	10	9	5
(1) The Cottar	366	108	3	21	11	17	16
(10) The Laird	291	97	9	15	9	16	21
(2) Niven's Premier	205	192	19	68	11	10	53

II.—Experiment with Main Crop or Late Varieties (100 sets, 14 inches apart per drill).

—	Dressed yield per pole.				Total per acre.		
	Ware	Seed	Chats.	Dis'd.			
	lbs.	lbs.	lbs.	lbs.	tons.	cwt.	lbs.
Tyne Kidney (cut sets)	129	36	4	3	12	5	80
Tyne Kidney (whole sets)	110	29	5	1	10	7	14
Northern Star	88	31	7	1	9	1	47
Up-to-Date	113	45	7	3	12	0	0
Factor (cut sets)	175	23	3	2	14	10	0
Factor (whole sets)	152	45	5	4	14	14	32
Pink Blossom	133	37	5	3	12	14	32
Dalhousie	149	37	5	5	14	0	0
Table Talk	102	39	6	4	10	15	80
Dalmeny Hero	116	39	6	5	11	17	16
Dalmeny Beauty	102	36	6	2	10	8	64
Dalmeny Regent	123	33	4	4	11	14	32
Warrior	111	29	5	2	10	10	0
Triumph	107	35	5	6	10	18	64
Duchess of Cornwall	79	18	5	5	7	12	96
Mayfield Blossom	142	46	6	2	14	0	0
Heather Blossom	46	20	5	—	5	1	48
Scarlett's "No. 2"	73	29	5	3	7	17	16
Table Talk	78	38	6	2	8	17	16
Up-to-Date	91	47	8	3	10	12	96
Dalhousie	109	39	6	3	11	4	32
Langworthy	77	41	4	1	8	15	80
Peacemaker	62	35	7	—	7	8	64
What's Wanted	65	44	6	—	8	4	32

Whole versus Cut Sets.

Mr. Bruce explained the plan adopted to secure a fair trial. Two-ounce whole sets were planted, and four-ounce sets cut longitudinally in two were planted as cut sets. This gave exactly the same weight of seed tubers per acre in each case. Mr. Bruce also pointed out that the produce of cut sets invariably gave a large proportion of ware tubers. I have always contended that this is one of the causes of Scotch seed being better than English seed. Scotch growers are, and have always been, given to planting cut seed, and my argument is that the resulting effect of persisting in this practice is in favour of heavier crops and larger tubers as against the planting of small sets. It must be remembered that cut seed is more suited for planting under the climatic conditions of Scotland than under those that obtain farther south.

Artificial Manuring.

Ten plots were set aside to test 10 different mixtures. The mixture recommended by the Board of Agriculture gave the best results last year, and this year the yield from the plot where it was applied is very near the top. The contents are as follow, and Mr. Bruce remarked that he considered it a "good all-round mixture." It is as follows :—½cwt. sulphate of ammonia, ½cwt. nitrate of soda, 2cwt. pure dissolved bones, 2cwt. superphosphate, ¾cwt. muriate of potash (92 per cent.). I hope the college authorities will observe how the potatoes grown with the different mixtures of artificial manures keep during the winter, and also what the tubers are like when cooked.

The outstanding feature of the trials was the care and thoroughness with which all the work was done. Duplicate plots to check the results of the first plots were grown, and even the produce of the different rows was weighed up separately in the manure experiments.

One thing that impressed me as a horticulturist was that quite a number of varieties which I knew gave excellent results in gardens were found to be of no use as croppers under field culture. A list of them is not given, but horticulturists will recognise among the sorts named above many which they know to be excellent as garden varieties, and therefore have the double qualification. Such work as this, being carried out by an authority so independent of all private interest in respective varieties of potato and manure mixtures, is worthy of great encouragement.

I was informed that the secretary of the college or Mr. Bruce, whose addresses are 13 George Square, Edinburgh, will gladly send a copy of the full report when it is published—about Christmas—to anyone interested.—*The Gardener's Chronicle.*

POTATO PRODUCTION.

At a meeting of the Kingston Branch Bureau of Agriculture, South Australia, Mr. M'Culloch read a paper on " The Potato: Its treatment, and how it should be planted," as follows:—

It was well known that the richer the soil and better prepared the greater was the chance of getting a good crop. But this alone has not got all to do with success in potato culture. Suitable situation and moisture were required. If the land was heavily manured, and little or no rain falls, then, unless it was a damp situation, the crop would be a failure. In preparing for planting new land turned over on the potato would often produce a good crop, but, if new and rough, a better plan was to plough the land, say, two months before seeding time, and plough again when planting.

The depth and distance apart would, to a great extent, depend upon the fertility of the soil. If a heavy crop is expected it should not be planted less than two feet by 18 inches between the rows. The best sorts of potatoes to plant must be proved by experience in each particular district. His experience was undoubtedly in favour of the Red Skin. The Pink Eye for keeping was quite equal, but not such a good flavour. The Brown River was undoubtedly the finest quality, but with him a very shy cropper.

He preferred to plant a whole potato, the large size of a pullet's egg. If it was intended to put in cut seed, try to cut and plant so as to have the cut side uppermost, as many misses are caused by planting them otherwise, and the blame put upon the seed. His style of planting was to put the seed under the mellow part of the furrow on the off side ; this prevents the big wheel of the plough smashing the seed. After finishing planting, nothing more was required to be done with the land for three weeks. Then it required a good harrowing, so as to loosen the surface for the plant to come through.

No further cultivation was necessary, unless the land is very weedy, till the plant was six or eight inches high. Then harrow again the way of the rows. An odd plant or so would be pulled up, but labour was saved and the soil benefited, which was then in a nice loose state for hoeing up at will. For situation, he had always found the eastern slope of the rise turn out best, but the most free from frosts was on the crown of the rise. The size of the seed could be regulated according to the fertility of the soil. He had known twelve tons per acre taken from seed cut to one eye only ; but this was an exception, as the land was very rich, and every row watered from a spring when required.

His experience has been (say) on ordinary potato land the larger the seed the more marketable potatoes could be taken off. If very small seed was sown on poor land it would produce very few large potatoes. The time for planting would depend on the situation. On the higher lands, lying to the east of the hummocks, plant about the beginning of September ; on the hummocks, the latter end of July, as the sand gets too hot, and scorches up quickly when warm weather sets in. Regarding the quality of seed to plant, only the best seed should be sown, as was the case with all other food plants. He recommended the changing of seed every two or three years.

SWINE FEVER.

Symptoms and Treatment.

Mr. D. McIntosh, V.S., professor of veterinary science in the University of Illinois, devotes a valuable chapter in his work on the "Diseases of Swine" to hog cholera and swine plague. The following is a digest of his remarks :—

"Hog cholera and swine plague are both very fatal diseases. They attack pigs at all ages, but shoats seem to be more liable to them than older pigs, which have more power of resisting the virus than the younger ones. There is no doubt but that the disease is the result of a bacteria, but why this bacteria should make its appearance is not easily understood. The reason why it does not usually kill all the pigs in a herd is that some have more resisting power, and in some way become immune to the action of the bacteria. Swine plague is just as fatal as hog cholera (swine fever), and both may be present in the same outbreak. The symptoms of the two are nearly identical, and only the microscope can determine the difference. In some years these diseases are much more virulent than in others—sometimes 90 to 100 per cent. succumb, sometimes not more than 20 to 30 per cent. of cases end fatally.

"*Symptoms.*—The sudden death of one or more hogs calls the attention of the breeder to the fact that something is wrong. In the early stages of the disease the pig will be dull and off its food. It likes to hide itself, and lies down most of the time. Its head is low and its ears lopped. Often pain is indicated by the constant moving of parts of the body, or the first symptoms may be a cough, with a little discharge from the eyes and nose. At this stage the appetite may not be impaired. Post-mortems have revealed well-marked ulcer tufts in the large intestines without the pig having previously lost its appetite. The pig lies mostly on its breast and abdomen, and may lie thus for hours. Violent vomiting may ensue, and the pig may become frantic, or it may lie unconscious until it dies. In the early stages the fæces are normal, but they soon become fœtid with dark diarrhœa. The pulse rises to 100 and 125 beats per minute, and the heart beats are barely perceptible. There is a peculiar spasmodic breathing in all cases where the lungs become congested. The hind legs become weak. Some time before death, bluish or purplish patches appear on the skin, especially on the inside of the hind legs. The temperature of the body is at first increased, but soon falls below normal. In a number of cases the animal dies in from three to six hours ; others live several days.

"*Post-mortem Appearance.*—On removing the skin there is usually found an accumulation of serum, often mixed with blood, causing red or black spots. In most cases of hog cholera all the organs of the body are more or less redspotted. On the internal surface of the large intestines a number of ulcerous tufts will usually be found. They are elevations of a dirty or sometimes yellowish-grey. They are more or less tough when cut with a knife. These growths sometimes extend through the intestines. In some cases the spleen is enlarged, and the lungs are usually implicated, especially in the case of swine plague. Hog cholera has usually more intestinal lesions, and swine plague more lung and liver affections.

"All pigs which die of cholera or plague should be buried deep, and the body covered with quicklime. Its pen and surroundings should be freely sprinkled with carbolic lotion. When the disease is in the neighbourhood, each pig should have 10 drops of strong nitro-hydrochloric acid in its food twice a day for a week. It is wise when the disease breaks out on the farm to separate all the well ones from those affected, and put them on the acid treatment. The nitro-hydrochloric acid is one of the best blood purifiers we possess.

"Many pigs can be cured, but it would not pay, except in the case of very valuable animals. The pigs should be put into a comfortable, well-ventilated place free from draughts, and in the early stages each should get two ounces of castor oil. This should be followed by giving 10 drops of nitro-hydrochloric acid well diluted with water three times a day; also give an ounce of spirits of turpentine in a little sweet oil once a day. Continue this for three or four days, then give four grains of quinine dissolved in two tablespoonfuls of good whisky, with same amount of water, three times a day for four or five days. As soon as the animal is able to eat, feed on milk and eggs, boiled flaxseed, oatmeal, etc. To be successful the treatment must be well done."

THE BREEDING OF PIGS.

Some Useful Hints.

Mr. Robert Wolfe, of Codj Codjan, Kellerberrin, sent the following interesting letter to the *Northam Advertiser* recently :—

I noticed in your valuable paper some few weeks ago an account of a farm near Cunderdin, wherein you told your readers about a gentleman going in for pigs. You mention in your paper two breeds—Berkshire and Large Black. As you also published an address by Mr. Wilding, which was very interesting to those who like "Dennis," and are trying to make money out of him, I would like to write you my ideas.

The market pig to-day must be a crossbred, that is if the farmer wants to get the most for his money and the quickest returns. The breeds I will refer to are the Large Black, Tamworth, and Berkshire, as they are the most common. I have kept all these breeds and also a record of them, and I find the Large Black to be in the lead as a farmer. When I kept Berkshires my average per sow was six pigs reared to two months old. My Large Black sows averaged ten pigs, and my half-bred sows averaged nine pigs. I find the Tamworth and Large Black cross sows then put back to a pure Berkshire boar have the quickest growing pigs.

To those who want to make a success of pig-breeding I will give them my experience, extending over 25 years.

1. As I consider it the most important, warm beds, sheltered from the wind, cold, and rain. No damp litter.

2. Keep Tamworth and Large Black sows. The latter, to my fancy, do better on rough feed, and the sun does not seem to hurt them. Boar, Berkshire.

3. Let the young pigs, as soon as they can run about, be able to find a shed or sty where they can get corn or some grain. I leave wheat or barley for mine.

4. If you want a quick return, feed the young pigs well and give them a start under proper conditions, and you can fatten Berkshires under four months. I prefer Large Blacks for a farm, as I can in four months have them 100lb. weight if I feed them well; they have more lean meat and not too much fat. I am certain if anyone tries Large Black sows and puts a Berkshire boar to them, those who see the result will not let those who have these pigs sell the females for porkers.

As at present I do not want to take up your space, but would like to mention I do not see why those who are always writing to the papers advising barley, as it is far better than wheat, into pork, should not advocate growing barley, as it is far better than wheat, and easy to grow. Also, it will stand feeding by stock, and then give a good return in grain. Rye can be put in late, and then give a good return in grain, and pigs do well upon it. All grain wants crushing, and I find a little oilcake mixed with the grain has a good result.

EQUIPMENT OF SMALL HOLDINGS.

By W. J. Malden.

Small holdings are generally accepted as those which are under fifty acres, but acreage does not measure them entirely, because where expensive, intensive cropping is taken the outlay and return of a single acre may exceed those of several acres under ordinary cropping. It is quite safe to say that there are many farms where ten acres realise as much as fifty in other conditions, but the capital required per acre is much greater, and the labour bill is proportionately heavy. The skill in the one case is also necessarily much greater than in the other. Small holdings may be divided into those in which horse labour is employed, and where it is not. Broadly speaking, where only ordinary fârm crops are taken, it is a waste of effort to rely on the spade, though spade work is beneficially expended upon the better-grade crops. On very small areas a horse is too expensive to pay for the work done, unless the horse can be hired out at spare times to earn part of his keep, but this does not necessarily follow. The great drawback to small holdings is that they afford so little remunerative employment during the winter months, and at that season, especially in bad weather, there is not much chance work obtained. It is for this reason that small holdings are often so much more remunerative when they are associated with some other business, such as hawker, publican, dealer, etc. It will be found by those who organise small holdings under large schemes involving co-operative methods that the difficulty of finding winter work will be one of the serious troubles.

Children on the Farm.

In respect to labour the small holder may have the advantage of the services of his wife and family. We are not among those who lay very great stress on this ; because we have seen so many cases where it has acted most cruelly on the sons kept at home. We have seen innumerable instances where it has hindered the prospects of sons of large farmers. It is not uncommon for fathers to regard their children as useful aids to the farm, whilst all the while they know that at the end the children will get very little from them ; meanwhile they have lost their opportunities in other directions. The sons work for little more than a bare living, they have no opportunity of saving; the father will not, and often cannot, give them anything to start on their own account, the consequence is they go on from year to year into middle age merely as servants of their father, waiting for him to die so that they may take his place, finding very often there is nothing left, or the little that is left has to be divided amongst a number, and that there is not sufficient to take on land enough to get a living from. The small holder cannot look for the same assistance from his children as was obtainable a generation or two ago. He has to face two facts—that his children will have to be kept for a longer period in the non-earning state, and that when he gets their services they will for a time be of less value than they used to be.

With special markets, already well supplied, it is not to special cropping that any great alteration in farming can be expected. We assert this after a wide experience in practically all special cropping, including market gardening, fruit growing, hop growing, seed growing, etc. We have seen several crops practically disappear or become relatively insignificant. Even Jersey has lost its high profits in respect of its more important crops, because those crops can be more cheaply raised in competitive countries more favourably situated. A farm of fifty acres is a large farm in miniature. It necessitates the use of horses if a considerable portion of it is under arable cropping. Horses involve the need for machinery ; and there is room for some live stock. The greatest difficulty in a farm of this size is to fit it out economically with adequate machinery ; practically all the kinds of machines required on a large farm are needed, yet the quantity of work got out of a machine per annum is very little ; consequently, if modern machines are used, more money is locked up than seems proportionate to the undertaking. As a rule the difficulty is met by purchasing old and inferior articles, clumsy in their work, and prone to break down. In spite of the apparently heavy cost of new machinery, we strongly urge against the use of obsolete or should-be obsolete machinery.

Mechanical Assistance.

Well chosen machines are bound to be far more remunerative in the end. Machinery has made great strides of late, especially in regard to haymaking and cultivating machines ; and a man would have a very limited acreage of hay or arable land, who could not make it economical to employ them. A modern springtime cultivator, with substituting attachments, will do all the work of stirring fallows, hore-hoeing, laying land up into ridges for root drilling, or moulding up potatoes. A modern haymaker with rotary turners will make better hay than can be made by hand, and infinitely cheaper. The hay tedder and hay rake are disappearing into the limbo into which older machines have already passed ; and though not so good as the modern machine, as they may be picked up for a small sum, may be found useful to the small holder who has little to spare on machinery.

A plough, set of harrows, and a roller are necessary, as is a small drill : but as drills suitable for small holdings are obtainable for £6, and as these are a type of implement that may be bought favourably second hand, the machinery equipment for working the land need not cost much. Grass and corn can be cut cheaper by machine than by hand ; but this is work which can be done by hired machines in most districts now, and where this is the case it is advisable to employ them, especially as horses are supplied. Except for a cart or carts there is little other expensive machinery to be bought, the threshing being done by hired sets of tackle. Such other implements and machinery as are needed will be those required in connection with live stock ; and as a rule the bigger live stock does not play a great part in small holdings, except where cows are kept.

If there is a dairy there must be the outfit in accordance with the method of disposal of the milk, whether sold retail, made into butter, or into cheese. The separator has greatly reduced the outfit where butter is made ; but a cheese outfit can scarcely be curtailed. Beyond this there are the small tools and hand implements, which are proportionately of greater importance on small farms. Skill in purchasing and ingenuity in contriving are very essential ; and the latter can be exercised with considerable advantage in providing the pig and poultry outfit.

Individual Labour.

As before stated, the live stock rarely plays an important part on a small holding, unless it be mainly grass ; and it is in working the land that a greater return may be looked for ; the two, however, go best together. On the whole the large farmer, with adequate capital, is more favourably placed than is the small farmer ; as he can be better equipped, that is, can get better value out of his outlay than can the smaller farmer ; but against this the small holder who works hard has the value of his labour to spread over the farm, and therefore reduces the cost of working each acre. If he has a family which helps him he is so much the better placed, and he gains in this what he would otherwise have to pay for outside labour.

The capital required by a small holder is not less than that required per acre by a farmer carrying on a similar type of farm on a larger scale, except that he saves his labour bill to a greater extent ; however, a large farmer may have sons who give him material assistance. An exception is made, of course, on a very small holding where practically everything is done by manual labour ; but a man's output of work is limited ; and except under favourable conditions he will not make much more of his labour than he would were he to put in as many hours of work for others as he does for himself, for there is always the chance of loss of crops to be kept in view. As suggested earlier, if specially skilled in fruit growing or market gardening, his labour and skill will fetch a better reward if soil, district, and climate are favourable ; but we have purposely left this question alone, as it is work for the specially experienced, for this affects the few and not the many.

A COMPARISON OF THE DIFFERENT CUTTINGS OF LUCERNE.

The Utah Experiment Station, a few years ago, conducted a very valuable experiment to determine when to cut lucerne and how many times it should be cut during the season in order to obtain the greatest yield of nutritious hay per acre. After thoroughly investigating this subject, they gave the following summary:—

1. The largest annual yield of hay per acre is obtained by the method of early cutting and the lowest by the late, the average result standing as follows : Early cutting, 100 ; medium, 92 and late, 85.

2. The early cut lucerne contains the highest per cent. of protein and fat, the most valuable food constituents, and the lowest per cent. of crude fibre, the most indigestible portion. The former decrease constantly while the latter increases rapidly from early bloom to the full maturity of the plant.

3. The proportionate amount of leaves to stems is greater at early bloom than at any subsequent time, and both leaves and stems contain a greater per cent. of protein and a less per cent. of crude fibre at this time than at any later period in the growth of the plant. The relative portion of leaves to stems in the different cuttings is as follows :—Early, 42 to 58 ; medium, 40 to 60 ; late, 33 to 67.

4. Lucerne leaves, as compared with stems, are very much richer in protein, fat and nitrogen-free extract and they contain a much smaller proportion of crude fibre. The per cent. of the protein and fat grows constantly less and that of the crude fibre greater from the time of early bloom to maturity. The average composition of all cuttings and crops shows the leaves to contain 150 per cent. more protein than the stems, 300 per cent. more fat, 35 per cent. more nitrogen-free extract and 256 per cent. less crude fibre.

5. The more important nutrients, protein and fat, have the highest per cent. of digestibility in the early cuttings, and it grows less and less with the age of the plant.

6. In the feeding tests, the highest gains were made from the early cuttings, and the lowest from the late, the results standing proportionately as follows :—Early cutting, 100 ; medium, 85 ; and late, 75.

7. The variation in the amount of the different cuttings eaten per day was very slight, being the highest for the early cutting and the lowest for the late, but the quantity of dry matter and also of digestible matter required for a pound of gain was decidedly lowest for the early cutting and highest for the late, the relative amounts of dry matter standing as follows: Early cutting, 100; medium, 131; and late, 166.

8. The annual beef product per acre was largest from the early cuttings, not only in the general average, but in each separate season's test, and that from the late cuttings was smallest, the proportional products standing as follows: Early cutting, 100; medium, 79½, and late, 69½.

9. Taking all points of comparison into consideration, both separatively and collectively, including everything that pertains to the largest yield

and highest feeding value, the tests favour cutting lucerne for cattle feeding when the first blooms appear.

Crop Comparison.

10. The first crop gave the largest yield in each of the five tests and in fourteen out of the fifteen cuttings, while the third crop gave the lowest for every test and in every cutting but one. The average acre yields for the five years, including all cuttings, stand in the following relation: First crop, 100; second, 78; and third, 39; for the early cuttings alone, first crop, 100; second, 83; third, 66.

11. In the average composition of all cuttings for three years, the nutrients of the three crops vary but little. The second has slightly the highest per cent. of protein and fibre, and the third crop the most fat and nitrogen-free extract.

12. The third crop has the largest proportion of leaves to stems, but the per cent. of protein in the leaves is highest in the second crop, and the next highest in the first. The leaves of the first crop contain the most fat, and of the second the least.

13. The third crop produced a higher average rate of gain in the feeding tests than the first or second, and also higher than any of the separate cuttings. The amount eaten daily was also highest of all, but the dry matter and digestible matter for a pound of gain were the lowest. In a pound per pound comparison the gains stand as follows: First crop, 100; second, 81; third crop, 126; dry matter for a pound of gain, first crop, 100; second, 115; and third, 69.

14. The beef product per acre, taking the average result of all cuttings for the five years, was very much the highest for the first crop and decidedly the lowest for the third, standing as follows: First crop, 100; second, 61, and third 45. But taking the early cuttings alone the stand: First crop, 100; second, 80, and third 69.

15. Pound per pound, taken as a whole, the results show the highest feeding value for the third crop and the lowest for the second.

16. The average annual beef product from early cut lucerne was 705.61 lbs. per acre; it required 9,575 lbs. of Timothy to produce an equal weight; 11,967 lbs. of red clover, and 10,083 lbs. of shredded corn fodder.

HINTS TO FARMERS ON MARES FOALING.

The period of gestation in mares lasts, approximately, eleven months, or, to be more precise, the average duration of pregnancy is forty-eight weeks and three days. It is, however, subject to some measure of variation, as mares do not always carry the foal for the exact average period. Often a mare foals down a few days, or a week, or even longer, before the full time is out, while it still more frequently occurs that mares go for a little longer than the usual period. It is very commonly found that mares carry a colt foal for a few days longer than a filly foal, but this is not by any means the general rule. When a mare is put to the horse, the last date of service should be carefully recorded by the farmer, so that the time when she is due to foal may be approximately known. It is most important that the farmer should know when his mares are due to foal, so that he may arrange to have them watched; he should, therefore, never fail to make a note of the dates when the mares are served by the horse.

Mares in foal should be kept at work up to the time of foaling—regular work on the farm. When near foaling, they must not, however, be overworked, for nowadays a good draught foal is worth many bags of wheat. The mare requires feeding up to the time of foaling just as she has been habitually fed. The best judge in the world cannot tell just when a mare will foal, signs of foaling being so uncertain. If all is well, a few days before foaling a wax will form on the teats; just before foaling the wax will drop off, and if the milk exudes she should not be left. The mare may foal at any minute, and should do so quickly, but they have been known to go many days with the milk thus exuding and the foal all right. It is, however, a bad sign, and often ends badly. Mishaps in birth are greater in proportion among draughts than among light mares; therefore it is in regard to draught mares that human aid can ofttimes be of immense service. A little knowledge at the time of delivery, even out in the paddock, can be of timely assistance. Approaching parturition is further indicated by a slackening and falling in of the muscles of the loins, and of the croup near the tail. This indication is not particularly noticeable, and will escape the notice of all but experienced breeders. When the mare is about to foal she behaves with restlessness, and evinces a great deal of uneasiness, thus showing in unmistakable fashion by her behaviour that her time has arrived. She keeps on moving about in an unsettled manner, and appears nervous, while the expression in her eyes plainly reveals her anxiety and apprehension. Her nervousness may further be evidenced by frequent staling, and by her pawing the ground with her forelegs, while she also lies down repeatedly and gets up again almost immediately afterwards, or she makes attempts to lie down without actually doing so.

In the actual process of delivery, if all is well, the forefeet will present themselves at once; the hand should then be inserted between the legs straight to the knees, and if the foal is coming right the nose will be felt. There will then be no difficulty in getting it away. Assist the mare very gently, but only when she is in labour; the pains will come on at intervals. Do not cut the navel cord; draw the foal gently away until the cord breaks, as it will do in the right place. Further, do not touch the navel with the hand, but pour a little carbolic oil on it at once, and repeat once a day until it has dried up. Having got the foal away, now take the cleansing, or after-birth, away from the mare. After dressing your hand with carbolic oil, insert it about ten inches, and put a gentle pressure on it. It will come away in a minute or two, but the operation is a delicate one, and care must be taken not to break off any portion. Any small portion left behind may cause blood-poisoning and the death of the mare. Teaching the foal to suck is a very difficult undertaking. If it is fairly strong it should be left alone, as it will soon suck of its own accord. If it does not suck in six hours, half a pint of its mother's milk should be given, and again six hours later; by that time it will suck, and thrive well.

Navel evil is a very serious complaint among foals. An experienced writer on stock-breeding in the "Live Stock Journal" attributes the cause of this ailment entirely to cutting and tying up the navel cord. Horses in a wild state, as in the bush, have nobody to cut the cord, and they do not bite it off, therefore it must be broken off when the mare gets up. In cutting the cord a small hole is left, like the stem of a pipe: that is where the poison enters and kills the foal. In pulling the foal away until it breaks, the cord becomes stretched, and there is no hole left in it, and the foal is safe. This is Nature's way, and there can be no doubt but that it is for this reason alone the best.

Sometimes the mother's milk disagrees with the foal, curdles on the stomach, and causes scouring. A tablespoonful of castor oil in a little of the mother's milk should be given. This carries the cause of the mischief away through the bowels. The danger with foals lies in their becoming costive; foals that scour slightly generally do well, and grow fast. A foal should be allowed to suck for at least twenty weeks. If weaned too young it does not get over it that year, and a month or six weeks longer with the mother works wonders. If the mare can be spared, the longer the foal sucks the better. If worms appear in the excreta of the foal, give plenty of salt in a bran-mash early in the morning, when the little animal is hungry; worms do not like salt.

If the mare is healthy, the ninth or tenth day after foaling is the best time to put her to the horse again, unless it is desired to let her miss a season. Some advocate alternate years, and the policy has some advantages to recommend it. If she misses then, the period will return in another fortnight. —*Elder's Review.*

PRESERVATION OF BUTTER.

A letter was recently received from the Secretary of the Pastoralists' Association of Western Australia in which it was stated that butter made on stations north of Gingin will not keep. The matter being referred to the Government Dairy Expert, Mr. Kinsella reports as follows:—

"It is difficult to understand why butter, if properly made, should not keep as well in one district as in another. There may be weeds in a district which would impart an undesirable flavour to the milk and the resulting butter, but such a flavour would be due to absorption and not to bacteria and will not become stronger. Flavours of this nature are termed "feed flavours" and though of course objectionable to the taste and smell do not render the butter unwholesome.

The most direct cause of butter not keeping is due to germ life or contamination with some filth source, perhaps manure, or liquid in the cow shed, or from dirty utensils, or from the cream being kept and ripened in an unsuitable place.

Absolute cleanliness is recommended at every stage—from the milking to the making of the butter. See that the butter is washed with pure water. Often we find dangerous bacteria in the water used which very rapidly causes deterioration in quality. If the water is not good, make unwashed butter, and work it more, so as to get all the butter milk extracted. A little good-

flavoured sour butter-milk, say 3 per cent. added to the cream 24 hours before churning will cause a more uniform ripening and give the produce a better keeping quality.

I would also recommend mixing thoroughly with the salt, about ½ per cent. of pure powdered Boracic acid or some good and well known butter preservatives. These can be procured from MacFarlane & Co. or other dairy supplies dealers. Do not use more than a ¼ of an ounce to 2lbs. butter. Keep in a cool place, away from turnips, onions, or such contaminating influence.

FARM NOTES FOR DECEMBER.

By Percy G. Wicken.

Since the issue of the last month's *Journal* the principal event in agricultural matters has been the holding of the Royal Show. This is the annual gathering of farmers and growers from all parts of the country, and at this time of the year more country residents may be found in the city than at any other period.

While the stock exhibits at the Royal Show indicate a marked improvement and increase every year, it is to be regretted that exhibits of farm produce do not increase in a like proportion. In the vegetable section the exhibits exceeded those of any previous year, both in number and quality, and made, taken all through, a very fine display. The dairy sections were extremely disappointing, and the few exhibits of butter were not nearly so good as might be seen at many of the country shows. It is hoped that next year a schedule will be arranged which will call forth a large exhibit of butter and other dairy produce. Considering all the discussions that have taken place about the dairy industry and the necessity that there is to stimulate the production of butter, a substantial prize offered by the Royal Society should do much to bring about a display of first-class butter made in the State at this, the principal show in Western Australia. In the farm sections the exhibits of wheat were disappointing, and it is to be regretted that the prize offered called forth so little competition. The same remarks apply to flour ; although we have over a dozen mills operating in this State, there were only two competitors for the prize for flour and mill products. The displays of fruit were first-class, and show that Western Australia has no need to fear competition from the other States in this regard. Most of the winning samples were purchased by the Agricultural Department and forwarded to the Melbourne Agency, with the idea of making a display of W.A. fruit there. The prize-winning honey exhibit was also purchased by the Department, and was sent, part to the Melbourne Agency and part to the Agent General, London.

The other shows held during the month were Newcastle, Pingelly Moora, Narrogin, and Katanning. With the exception of Narrogin, which, owing to its having been the National Show last year, could not be expected to keep up this year, they all showed a distinct improvement on those of previous years, the progress made by Pingelly especially being almost phenomenal, the entries exceeding by four times those of the previous year.

The increase in the entries, and particularly in the quality of the exhibits, to the shows along the Great Southern line is a feature for congratulation, and is indicative of the great strides that are being made in agricultural matters. The entries in the butter section at Katanning were numerous, and the butter was of as good a quality as any yet seen at any show in this State. They show that considerable attention is being devoted to the butter-making industry in this State.

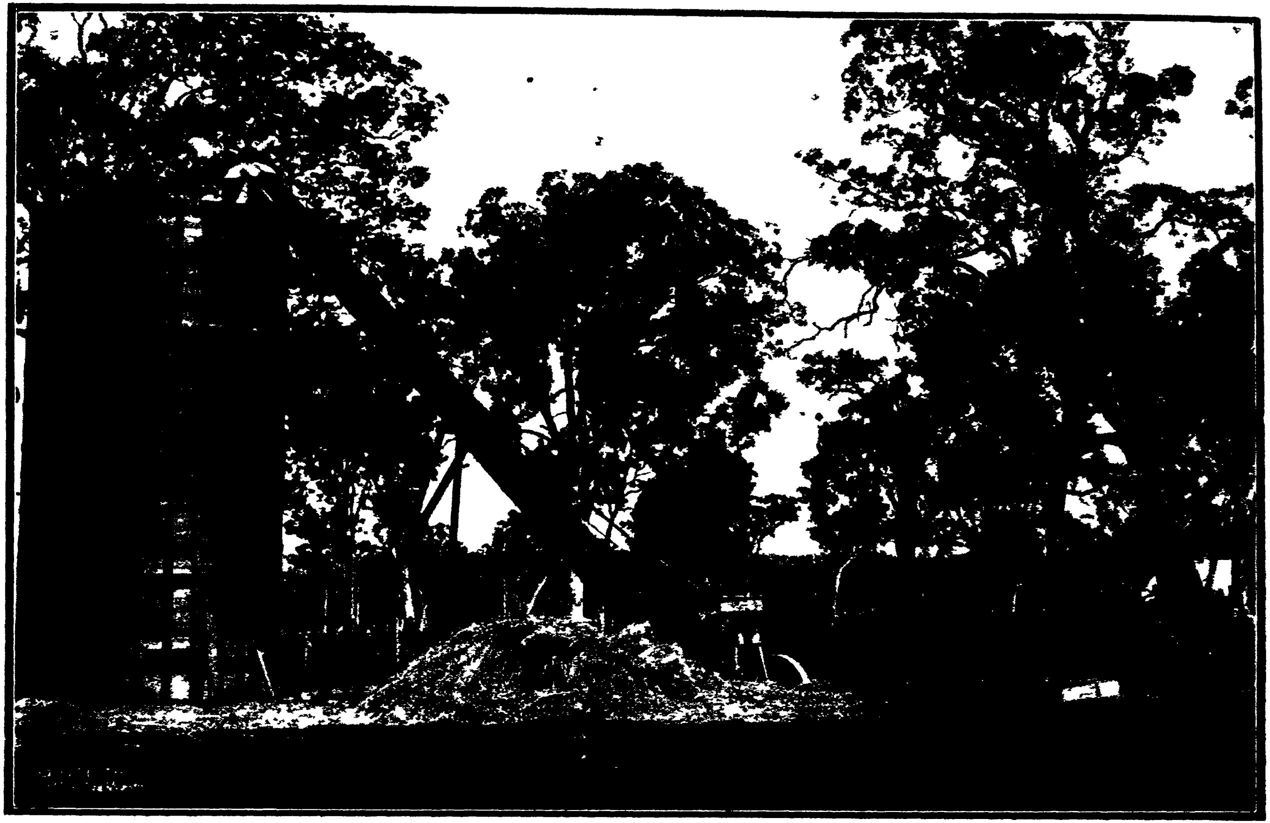
The shows on the Eastern and Southern lines are now practically over, and farmers will require to turn all their attention to the necessary business of harvesting their crops. The hay harvest this year is somewhat later than usual, but by the time these notes appear will be in full swing. Owing to the demand for chaff for the Eastern States there is no doubt that unless rain falls soon on the New South Wales side to stop this demand, there will be a large quantity of the new hay chaffed straight from the field and sent away this season. The wheat harvest promises to be more than satisfactory, both in regard to the yield and the price obtainable, the price now being offered being higher than has been offered for years past, thus yielding wheat-growers handsome profits. Many farmers who have wheat for sale have been forming very big ideas as to value, but they should bear in mind that wheat-growing and speculation in wheat do not go well together. When the farmer can obtain a good price for wheat it is policy for him to sell the greater part of his crop, and not hold on too long for the chances of securing a few extra pence per bushel. Last year, when the price of wheat was at bed-rock figure, no one had anything to lose and every prospect of gaining by hanging on, but this season, when a high price is being offered, it is a questionable proceeding to hold back too much.

The season having been a good one, and the native grasses having made splendid growth, the dangers from bush fires are likely to be great, and settlers should take every precaution to protect their hay stacks and buildings from danger of fire. As soon as ever the hay stack is constructed a firebreak of about half a chain in width should be ploughed all round it.

While the wheat harvest is in progress I should like to call attention to the fact that this State is very desirous of making as good display of wheat as possible at the Franco-British Exhibition, which is to be held in London in May next, and for this purpose particularly request that all those who have any really good samples of wheat will forward two-bushel lots of same to the Secretary of the Board, giving full particulars where grown, class of soil, yield per acre, etc. The Board will be prepared to pay for this wheat at current rates and display it in London, with the name of the district and other particulars attached thereto. At the Katanning Show samples of wheat weighing 68lbs. and 67½lbs. respectively per bushel were shown, and the Board will be glad of any samples equal to any of these, or any better, if such are available.

As soon as the hay is carted off the field or the wheat stripped, the sheep should be turned into the stubble, as they will then pick up all the loose grain (which would otherwise go to waste) and rapidly put on condition.

Very little in the way of planting can be done this month, except where water is plentiful for growing purposes. In the South-West districts, where



Tub Silo recently erected at Narrogin State Farm.

swamp lands are available, fodder crops may still be sown to provide green fodder for stock, as well as vegetables for home use.

During the month a tub silo on the Victorian principle, illustrated in this issue of the *Journal,* was erected at Narrogin State Farm, and two similar ones are in course of erection at the Brunswick Farm. The silo at Narrogin has been filled with a mixture of barley, rye, and peas, put through a chaff-cutter, and elevated into the side of the silo. This will give a valuable lesson to surrounding farmers in the conservation of fodder, and will also provide a supply of good fodder for the farm cattle. The making of silage is bound to take a very prominent part in farming operations in this State. as it is the most practical and economical means of providing a supply of fodder for stock during the summer months, when the natural pastures are dried up. During the winter and spring months of the year we have abundance of fodders, both natural and cultivated, and by the process of ensilage these can be preserved in their most succulent state for use when required. The feeding of stock on silage is much more economical than that of feeding on hay, as by this means there is very little loss in the weight of fodder. Taking, roughly speaking, 10 tons of green wheat, barley, oats, etc., will make about 3 tons of hay, while the same quantity makes approximately 10 tons of silage. A cow will eat the same quantity of silage or hay per day, consequently the supply will go three times as far, and in addition to which, a much better flow of milk is obtained from the use of silage, as it is in a more succulent state, and requires less loss of energy on the part of the cow to assimilate the food constituents.

Silage can be made by many systems, either by the ordinary stack silo, in which the green stuff is built up practically in the same way as the hay stack, and then pressed down by means of weights, or simply by filling the silo and covering with earth, or by means of a more elaborate structure still with screw presses to press the fodder by mechanical means, or again, by means of tub silos of the pattern recently erected at the State Farms.

In making silage great care should be taken to cut the green fodder when it is in its most succulent state, and that is, as soon as it has broken into head and the flowers have appeared, and before the straw begins to get anyway dried. If the straw once begins to get dried it does not compare as a fodder with that taken greener. It should be carted immediately it is cut, and may be taken in quite wet and put into the silo. In the case of tub silos, where it has to be elevated in, it is much better to chaff the material, and care should be taken that the sides of the silo are thoroughly well tramped down while filling takes place. It is through the sides that any air is liable to get into the stack, and wherever air can enter decomposition is likely to set in. and loss occurs. If the edges are thoroughly pressed or tramped down while filling takes place, the air is thoroughly excluded and a better quality of silage is turned out. In the case of a pit silo it is not so necessary to chaff the material, whereas with stack silage it cannot be done, and the stack should be built in much the same way as a hay stack, special care being taken to pack the edges as solidly as possible, as by this means there is a minimum of loss. Although the stack silo is somewhat cheaper in construction than any other, there is a greater amount of loss at the sides. However, if well built this loss is not equal to the decreased cost in constructing the pit or tub silo.

GOVERNMENT LABOUR BUREAU.

OCTOBER REPORT.

The following report on the work of the Labour Bureau for October has been issued by the Superintendent, Mr. James Longmore:—

Perth.

Registrations.—The total number of men who called during the month in search of work was 718. Of this number 368 were new registrations, and 350 renewals, i.e., men who called who had been registered during the year prior to the month of October. The trades or occupations of the 718 applicants were as follows:—Labourers 213, handy men 74, handy lads 67, farm hands, 59, cooks 35, bushmen 25, carpenters 21, shearers 21, gardeners 13, painters 13, miners 12, drivers 10, engine-drivers 10, grooms 9, dairymen 8, fitters 8, yardmen 8, bricklayers 7, hotel hands 7, station hands 7, blacksmiths 6, firemen 6, clerks 5, plasterers 5, bakers 4, brickmakers 4, carpenters (rough) 4, kitchenmen, orchardists, plumbers. sawmill hands, and teamsters 3 of each, and 42 miscellaneous.

Engagements.—The engagements for the month totalled 300. The classification was as follows:—Labourers 102, farm hands 40, handy men 25, bushmen 19, handy lads 17, shearers 12, gardeners 8, dairymen 7, carpenters 6, cooks 6, woodcutters 6, kitchenmen 5, groom-gardeners 4, well-sinkers 4, boys for farms 3, fencers, hotel hands, miners, plasterers paperhangers, quarrymen, sleeper-hewers, and waiters 2 of each, and 20 miscellaneous.

Kalgoorlie.

Registrations.—There were 29 new registrations and 30 renewals. The classification was as follows:—Labourers 21, handy men 19, handy youths 6, engine-drivers 2, blacksmiths, barmen, cooks, carpenters, drivers, fitters, grooms, miners, plumbers, paperhangers, and yardmen 1 of each.

Engagements.—The engagements were 6, viz.:—Labourers 5, and 1 handy man.

The female servants who called numbered 33. The classification was as follows:—Generals 5, waitresses 5, light generals 5, housemaids 4, housekeepers 4, cooks 3, laundresses 3, charwomen 3, and kitchenwomen 1. There were no engagements.

Northam.

Registrations.—The aplicants for work numbered 33, classified as follows:—Labourers 19, shearers 4, farm hands 4, clearers 2, engine-drivers, gardeners, handy lads, and stonemasons 1 of each.

Engagements.—There were 7, viz.:—Farm hands 4, shearers 2, and labourers 1.

Women's Branch, Perth.

Registrations.—The new registrations for the month were 65, and the renewals 59. The classification was as follows:—Laundress-charwomen 28, housemaids 22, generals 19, cooks 16, housekeepers 13, light generals 11, waitresses 5, governesses 2, nursemaids 2, and 6 miscellaneous.

Engagements.—The engagements numbered 62, classified as follows:—Laundresses-charwomen 33, generals 9, light generals 4, cooks 4, cook-laundresses 2, useful girls 2, housemaids 2, and 6 miscellaneous.

General Remarks.

The number of individual men who called at the Central Office, Perth, during the month in search of work was 718. This total is 25 in excess of that for September, and 84 in excess of the number for October last year. The engagements were 300; the number is 83 in excess of that for September, and 73 in excess of that for October last year. Of the 300 engagements, 207 were by private persons and 93 by Government departments. The engagements for the country districts totalled 221, and the town 79. During the month there were 44 men assisted by railway passes from the Central Office, Perth. The fares refunded totalled £35 12s. 2d., and the sum of £8 15s. 9d. was received from employers to send men, also £6 4s. 4d. to send women. At Kalgoorlie branch 3 men were assisted by passes, and the sum of £6 9s. 7d. was refunded, the whole amounting to £57 1s. 10d. At Kalgoorlie branch the applicants for work were 92 (59 men and 33 women), and at Northam branch, 33 men. The engagements at Kalgoorlie were 6, and at Northam 7. At the Women's Branch, Perth, 124 women called during the month; the number is 13 short of that for September and 25 short of the number for October last year. The engagements were 62, this being 10 in excess of the total for the previous month, and 9 short of that for October last year.

LOCAL MARKET REPORT.

Market Report of the W.A. General Produce Company for the week ending Wednesday, November 6th, 1907 :—Business during the past week very fair. Supplies irregular. Values very much upset, detailed particulars as follows : Bacon supplies light, values firm, tendency to rise. Hams exceedingly scarce, and well-known brands big prices asked for. Butter, fair supplies, with values tending to materially harden. Cheese, good supplies, values moderate with tendency to rise. Eggs, country lots arriving very freely, and selling at low rates from the producers' point of view. Potatoes, imported lots have eased somewhat, but sales hard to quit, buyers preferring local newly-dug, the latter realising good prices. Onions had a sharp rise in Victoria, and now a rapid fall. Chaff supplies for local requirement not over plentiful, and quality offering just now very indifferent, whereas values owing to export demand keep fairly high. Millers' lines, values of same absolutely uncertain. Fruit very scarce indeed, and the small lots offering realise very high values. Vegetables, fair supplies, with values ruling just now being in favour of the grower. Poultry, great numbers of hens and aged birds very hard to dispose of at a good price, whereas young table birds are scarce and worth high values; good demand for fat turkeys. Ducks, fairly plentiful.

Farm and Dairy Produce.—Bacon, sides, from 10¼d. to 10½d. lb. Hams, best, 1s. to 1s. 2½d. lb. Butter, choice factory, 1s. 0½d. lb. ; other good brands, 11½d. ; pastry, 10½d. Lard, in one-pound packets, 8d. lb. Cheese, medium, 8¾d. ; loaf, 9¼d. Eggs, suburban, 11d. to 12½d. doz.; country, 10d. to 11d. doz. Potatoes, imported, £6 10s. to £7 per ton ; local, £6 15s. to £11 10s. Onions, 10s. per cwt. Chaff, best, £4 10s. to £4 17s. 6d.;

other, £3 12s. 6d. to £4. Bran and Pollard, from £7 15s. to £9 per ton. Flour, £11 10s. to £12 per ton. Oats, white, 4s. 9d. to 4s. 10d. per bushel; Algerian, 3s. 6d. to 4s. per bushel. Maize, worth 5s. 6d. per bushel. Wheat, 5s. 6d. to 6s. per bushel. Oil-cake, £8 10s. per ton.

Fruit.—Oranges, navel, best 14s. 6d. to 21s., medium 10s. to 12s. 6d.; ordinary, 9s. 6d. to 15s. Lemons, 3s. 6d. to 7s. Mandarins, 12s. 6d. to 15s. per case. Loquats, from 3s. 6d. to 10s. per case. Passion fruit, 12s. to 14s. per case. Cape Gooseberries, 3½d. to 5d. lb. Strawberries, from 6s. 6d. to 15s. per doz. punnets. Apples, from 11s., 14s., 16s. 6d., 17s., 21s. per case.

Vegetables.—Cabbage, from 2s. 6d. to 6s. 6d. per cwt. Carrots, from 5d. to 1s. per doz. bunches. Parsnips, from 6d. to 1s. 6d. per doz. bunches. Turnips, white, 4d. to 1s. per doz. bunches; Swedes, 1s. 6d. to 1s. 9d. per doz. bunches. Beans, French, 2d. to 2½d. per lb.; Broad, ¼d. to ½d. per lb. Peas, green, 1½d. to 2½d. per lb. Marrows, 9d. to 2s. 6d. per dozen. Rhubarb, from 1d. to 2½d. per lb.

Salads and Herbs.—Lettuce, from 6d. to 2s. per quarter bag. Spring Onions, from 4d. to 9d. per bundle. Beetroot, from 6d. to 1s. 3d. per doz. bunches. Cucumbers, 3s. to 6s. 6d. per doz. Tomatoes, 13s. to 16s. 6d. per quarter case. Celery, 6d. to 2s. 9d. per doz. heads. Cress, 9d. to 1s. per doz. bunches. Radishes, 3d. to 6d. per doz. bunches. Thyme, Marjorum, and Sage, 2s. per tray. Mint and Parsley, 3d. per bundle.

Poultry (for killing).—Fowls, prime table birds, young and fleshy, 5s. to 6s. 6d.; hens and mixed lot, 3s. to 4s. 6d. per pair. Chickens, 2s. 9d. to 3s. 6d. Ducks, from 3s. 6d. to 6s. per pair. Ducklings, 2s. 9d. to 3s. 6d. per pair. Geese, 8s. to 10s. per pair. Turkeys, gobblers, 18s. 6d. to 22s. 6d.; hens, 11s. to 14s. per pair.

Carcase Meat.—Pork, medium weights, 6d. to 6½d. per lb.

Sundries.—Corn Sacks, 5s. 6d. second hand. Bran Bags, 3s. 6d. second hand. Bonedust, £7 10s. Phosphate, £4 10s. Guano, £4 10s. to £5 10s. Ammonia, 20s. per cwt. Nitrate of Potash, 17s. per cwt.

NOTES ON THE CLIMATE FOR THE MONTH OF OCTOBER, 1907.

There was nothing specially noteworthy in the weather for this month. The reports from day to day indicate the gradual change from the winter to the summer conditions, and we have had a few mild disturbances of the latter type passing overland in a general south-easterly direction. In west coastal districts the temperature has been below normal, and the summer seems to have been barely noticed so far, but in the interior it has been hotter than usual.

Pressure has been normal throughout the State.

The rainfall was above the average in the extreme South-West (*i.e.*, from Perth to Albany), but elsewhere lighter than usual; and from the Murchison northwards to the Kimberley district no rain fell, which accords with the usual conditions at this time of the year.

W. E. COOKE,
Government Astronomer.

Perth, 13th November, 1907.

The Climate of Western Australia during October, 1907.

	Locality.	Barometer (corrected and reduced to sea-level). Mean of 9 a.m. and 3 p.m.	Barometer: Average for previous years.	Barometer: Highest for Month.	Barometer: Lowest for Month.	Shade Temperatures. October, 1907. Mean Max.	October, 1907. Mean Min.	October, 1907. Mean of Month.	October, 1907. Highest Max.	October, 1907. Lowest Min.	Average for previous Years. Mean Max.	Average for previous Years. Mean Min.	Average for previous Years. Highest ever recorded	Average for previous Years. Lowest ever recorded.	Rainfall. Points (100 to inch) in Month.	Rainfall. Wet Days.	Rainfall. Total Points since Jan. 1.
NORTH-WEST AND NORTH COAST:	Wyndham	29·839	29·892	29·980	29·694	97·3	81·2	89·2	104·0	77·1	98·3	79·5	110·2	68·5	17	4	1,910
	Derby	29·927	29·914	30·059	29·719	98·1	71·6	84·8	109·0	55·8	97·0	71·2	112·2	58·6	*Nil*	...	2,401
	Broome	29·916	29·923	30·031	29·720	91·3	71·5	81·4	105·4	60·2	90·8	70·6	108·6	52·8	*Nil*	...	2,370
	Condon	29·910	29·940	30·001	29·736	93·1	61·6	77·4	108·8	51·0	90·8	61·9	108·2	49·0	*Nil*	...	1,011
	Cossack	29·915	29·950	30·080	29·760	95·0	69·0	82·0	108·0	57·0	92·3	65·3	110·5	56·0	*Nil*	...	2,028
	Onslow	29·982	29·968	30·148	29·845	92·5	63·0	77·8	105·3	53·0	88·6	60·1	108·5	48·5	*Nil*	...	874
	Winning Pool ...	30·009	...	30·189	29·834	90·6	57·2	73·9	103·2	48·2	...	...	...	...	*Nil*	...	1,173
	Carnarvon	30·070	30·032	30·244	29·861	76·2	57·9	67·0	91·2	51·0	78·3	60·7	100·6	50·8	2	1	1,137
	Hamelin Pool... ...	30·053	30·016	30·249	29·836	80·0	53·5	66·8	95·2	43·0	81·8	55·1	101·6	44·6	7	2	874
	Geraldton	30·087	30·062	30·299	29·766	71·7	55·4	63·6	80·8	46·0	73·3	55·0	100·0	41·0	20	7	2,339
INLAND:	Hall's Creek	29·878	29·919	30·042	29·693	101·8	71·3	86·0	107·2	59·0	97·7	67·8	109·0	48·4	47	2	1,747
	Marble Bar	...	...	...	...	102·5	68·7	85·6	111·5	55·0	98·0	66·3	113·0	53·2	*Nil*	...	983
	Nullagine	29·912	29·926	30·049	29·703	99·1	60·9	80·0	108·0	46·8	94·2	60·8	112·0	45·9	*Nil*	...	873
	Peak Hill	29·979	29·960	30·197	29·657	86·2	58·2	72·2	95·0	48·3	84·5	58·4	100·4	41·3	4	1	853
	Wiluna	29·952	29·990	30·176	29·682	85·7	56·0	70·8	97·2	43·0	82·8	54·2	101·8	41·5	*Nil*	...	683
	Cue	30·004	29·998	30·245	29·771	83·2	52·7	68·0	94·3	42·8	82·4	54·9	99·1	41·5	6	2	775
	Murgoo	...	...	...	...	81·0	52·4	66·7	94·0	41·5	...	...	...	...	4	1	822
	Yalgoo	30·032	30·005	30·293	29·721	78·8	50·3	64·6	96·8	40·9	80·5	52·5	98·6	38·7	6	2	828
	Nunngarra	30·016	...	30·239	29·751	79·4	50·9	65·2	90·0	42·0	...	...	...	...	6	1	645
	Lawlers	30·002	29·983	30·225	29·766	84·1	53·9	69·0	95·2	44·4	81·5	55·2	103·1	41·2	2	1	812
	Laverton	29·988	30·002	30·301	29·644	82·3	54·3	68·3	98·0	43·9	80·3	53·5	103·1	39·0	21	1	779
	Menzies	29·954	29·988	30·249	29·611	80·0	51·8	65·9	94·5	42·0	78·9	53·0	99·0	39·2	25	1	655
	Kanowna*	...	...	...	...	78·0	49·1	63·6	93·0	39·2	75·5	49·6	98·1	38·3	9	1	887
	Kalgoorlie	29·984	29·994	30·310	29·614	79·3	51·2	65·2	93·2	38·4	77·6	52·3	99·0	39·8	5	1	960
	Coolgardie	30·006	29·996	30·344	29·660	77·8	49·8	63·8	92·0	37·4	77·1	50·7	99·8	38·7	15	2	1,030
	Southern Cross ...	29·990	29·992	30.300	29·581	79·5	47·1	63·3	95·0	33·5	77·5	48·6	98·3	35·0	3	1	915
	Kellerberrin	...	...	...	...	...	...	...	...	...	...	...	...	...	21	3	1,169
	Walebing	...	...	...	...	70·8	45·9	58·4	90·2	34·0	71·3	47·0	91·9	33·8	101	11	2,301
	Northam	...	...	...	...	72·5	46·8	59·6	90·0	35·5	73·4	47·1	94·5	34·7	65	9	1,952
	York	30·040	30·034	30·291	29·651	72·0	45·6	58·8	88·6	38·0	73·0	46·8	93·5	31·4	86	11	1,918
	Guildford	...	...	...	...	69·6	51·8	60·7	88·0	44·9	72·5	51·1	98·5	40·6	248	16	3,890

The Climate of Western Australia during October, 1907—*continued.*

	Locality.	Barometer (corrected and reduced to sea-level). Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month	Shade Temperatures. October, 1907. Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.*	Average for previous Years. Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Rainfall. Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
South-West and South Coast:	Perth Gardens	29·061	30·057	30·320	29·692	69·1	54·6	61·8	82·5	47·8	71·6	52·6	97·0	38·0	259	19	3,751
	Perth Observatory ...	29·064	30·050	30·320	29·700	67·3	53·3	60·3	80·6	46·2	69·3	53·2	93·4	41·2	289	17	3,959
	Fremantle	29·081	30·053	30·314	29·734	65·7	55·6	61·2	84·5	48·5	68·0	55·6	93·4	41·6	216	18	3,604
	Rottnest	29·073	30·035	30·291	29·725	65·6	55·8	60·7	75·2	50·5	67·6	56·2	91·2	43·5	134	13	2,701
	Mandurah	...	...	...	...	66·7	52·1	59·4	77·7	40·0	69·7	50·2	91·8	36·3	311	18	4,507
	Marradong	...	...	...	...	...	...	...	...	...	...	...	...	...	163	16	2,829
	Wandering	...	...	...	...	70·2	42·7	56·4	83·6	33·5	68·6	41·5	89·0	30·1	136	11	2,661
	Narrogin	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..
	Collie	...	...	...	...	66·6	44·9	55·8	84·2	37·5	68·2	44·2	91·7	31·2	385	15	3,609
	Donnybrook	...	...	...	...	66·6	46·9	56·8	83·0	39·0	67·9	57·5	92·9	36·2	497	19	4,146
	Bunbury	29·036	30·026	30·314	29·678	66·7	51·9	59·3	77·1	41·0	68·3	50·9	89·2	37·4	429	17	3,456
	Busselton	...	...	...	...	66·1	50·6	58·4	79·8	42·0	68·0	47·9	90·2	37·2	423	20	3,639
	Cape Naturaliste ...	29·030	...	30·304	29·590	62·9	51·1	57·0	69·0	43·2	...	...	...	...	373	20	3,889
	Bridgetown	...	...	...	...	66.1	44·1	55·1	82·1	34·3	68·3	43·7	92·1	31·2	480	20	3,439
	Karridale	29·012	30·035	30·293	29·556	66·3	50·2	58·2	71·8	39·7	65·8	49·8	90·6	35·2	470	19	5,207
	Cape Leeuwin	29·978	29·989	30·327	29·431	64·0	54·2	59·1	69·8	49·6	64·4	54·7	86·7	44·8	355	23	4,483
	Katanning	...	30·008	30·287	29·576	67·9	44·4	56·2	83·0	37·1	68·4	45·6	90·7	31·0	107	8	1,854
	Mt. Barker	...	...	...	...	63·5	44·9	54·2	78·3	34·8	...	...	...	...	346	19	3,041
	Albany	29·976	30·003	30·319	29·519	64·9	49·0	57·0	76·0	43·8	65·2	49·4	91·0	36·2	589	20	3,967
	Breaksea...	29·956	30·002	30·308	29·478	61·6	50·5	56·0	72·2	44·8	61·8	51·8	86·0	39·0	428	24	3,697
	Esperance	30·011	30·006	30·343	29·607	68·4	48·3	58·4	86·0	40·0	69·1	50·8	101·4	36·2	165	10	2,606
	Balladonia	29·972	30·023	30·329	29·544	77·2	46·8	62·0	94·8	37·0	74·7	47·4	99·5	35·0	50	1	862
	Eyre	29·958	30·029	30·194	29·555	74·1	49·7	61·9	100·4	42·0	71·7	50·6	100·2	30·0	2	1	934
	INTERSTATE.																
	Perth	30·064	30·050	30·320	29·700	67·3	53·3	60·3	80·6	46·2	69·3	53·2	93·4	41·2	289	17	3,959
	Adelaide	29·996	30·021	30·401	29·520	68·7	50·8	59·8	96·7	41·2	72·7	51·4	100·5	36·0	100	13	1,655
	Melbourne	...	29·883	...	...	..	...	...	...	...	67·0	48·1	96·1	32·1	137	7	1,429
	Sydney	29·990	30·001	30·360	29·540	73·0	58·0	65·5	90·0	50·0	71·0	55·9	99·7	43·3	59	3	2,752

* Averages for three years only.

The Observatory, Perth, 12th November, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for September, 1907 (completed as far as possible), and for October, 1907 (principally from Telegraphic Reports).

STATIONS.	SEPTEMBER, 1907.		OCTOBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham	*Nil*	...	17	4
Carlton	...	...	...	...
Ivanhoe	*Nil*	...	...	...
Argyle Downs	*Nil*	...	...	...
Rosewood Downs	...	...	...	...
Lisadell	...	...	...	...
Turkey Creek	*Nil*	...	89	6
Ord River	*Nil*	...	...	...
Alice Downs	...	...	...	...
Flora Valley	...	...	...	...
Hall's Creek	*Nil*	...	47	2
Nicholson Plains	...	...	...	...
Ruby Plains	...	...	...	...
Denison Downs	...	...	...	...
WEST KIMBERLEY:				
Mt. Barnett	...	...	...	...
Mt. House	...	...	...	...
Leopold Downs	*Nil*	...	...	...
Fitzroy Crossing (P.O.)	*Nil*	...	*Nil*	...
Brooking	...	...	...	...
Cherrabun	*Nil*	...	...	...
Bohemia Downs	...	...	...	...
Quanbun	*Nil*	...	...	...
Nookanbah	...	...	...	...
Upper Liveringa	..	...	...	...
Yeeda	*Nil*	...	...	...
Derby	7	1	*Nil*	...
Pt. Torment	19	1	*Nil*	...
Obagama	50	1	...	...
Beagle Bay	*Nil*	...	...	..
Roebuck Downs	...	...	...	...
Broome	74	2	*Nil*	...
La Grange Bay	1	1	*Nil*	...
Rollah	*Nil*	...	...	...
N.W. COAST:				
Wallal	*Nil*	...	*Nil*	...
Pardoo	...	...	...	...
Condon	*Nil*	...	*Nil*	...
DeGrey River	*Nil*	...	...	...
Port Hedland	*Nil*	...	*Nil*	...
Boodarie	*Nil*	...	...	...
Whim Creek	*Nil*	...	*Nil*	...
Mallina	...	...	...	...
Croydon	*Nil*	...	...	...
N.W. COAST—*contd.*				
Sherlock	...	...	...	...
Woodbrooke	*Nil*	...	...	...
Cooyapooya	*Nil*	...	...	...
Roebourne	*Nil*	...	*Nil*	...
Cossack	*Nil*	...	*Nil*	...
Fortescue	*Nil*	...	*Nil*	...
Mardie	...	...	...	...
Chinginarra	...	...	...	...
Yarraloola	...	...	...	...
Peedamullah	...	...	...	...
Onslow	*Nil*	...	*Nil*	...
Point Cloates	...	...	...	...
N.W. INLAND:				
Ethel Creek	...	...	...	...
Warrawagine	...	...	...	...
Eel Creek	...	...	...	...
Muccan	...	...	...	...
Ettrick	*Nil*	...	...	...
Strelly	...	...	...	...
Carlinda	*Nil*	...	...	...
Mulgie	...	...	...	...
Warralong	...	...	...	...
Coongon	*Nil*	...	...	...
Talga	*Nil*	...	...	...
Bamboo Creek	13	1	*Nil*	...
Moolyella	...	...	...	...
Marble Bar	*Nil*	...	*Nil*	...
Warrawoona	*Nil*	...	*Nil*	...
Corunna Downs	*Nil*	...	...	...
Mt. Edgar	...	...	...	...
Nullagine	*Nil*	...	*Nil*	...
Balfour Downs	*Nil*	...	...	...
Bonny Downs	...	...	...	...
Middle Creek	*Nil*	...	...	...
Mosquito Creek	...	...	...	...
Roy Hill	*Nil*	...	...	...
Bamboo Springs	...	...	...	...
Kerdiadary	*Nil*	...	...	...
Woodstock	*Nil*	...	...	...
Yandyarra	...	...	...	...
Station Peak	...	...	...	...
Mulga Downs	*Nil*	...	...	...
Mt. Florence	*Nil*	...	...	...
Tambrey	*Nil*	...	...	...
Tableland	*Nil*	...	...	...
Millstream	*Nil*	...	...	...

RAINFALL—*continued.*

STATIONS.	SEPTEMBER, 1907.		OCTOBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. INLAND—*contd.*				
Red Hill ...	...	...	...	...
Mt. Stewart ...	...	...	...	...
Coorara	...	...	...	...
Peake Station ...	*Nil*	...	...	...
Nanutarra ...	...	...	...	...
Yanrey	...	...	...	...
Towara	*Nil*	...	...	...
GASCOYNE:				
Winning Pool ...	*Nil*	...	*Nil*	...
Coordalia ...	...	...	...	...
Wandagee ...	...	...	...	...
Williambury ...	4	1	...	.
Yanyeareddy ...	...	...	...	...
Maroonah ...	...	...	...	...
Ullawarra ...	...	...	...	...
Mt. Mortimer ...	...	...	...	...
Edmunds ...	8	1	...	...
Gifford Creek ...	...	...	...	...
Bangemall ...	*Nil*	...	...	...
Mt. Augustus ...	...	...	...	...
Upper Clifton Downs	*Nil*	...	...	...
Clifton Downs ...	4	1	...	...
Mearerbundie ...	...	...	...	...
Byro	7	1	*Nil*	...
Meedo	4	1	...	...
Minnie Creek ...	*Nil*	...	...	...
Bintholya ...	...	...	...	...
Lyon's River ...	*Nil*	...	...	...
Mangaroon ...	...	...	...	...
Booloogooroo ...	*Nil*	...	...	...
Junction Station	5	1	...	...
Doorawarrah ...	*Nil*	...	...	...
Brick House ...	...	...	...	...
Boolathana ...	...	...	...	...
Carnarvon ...	17	1	2	1
Point Charles ...	9	2	...	...
Dirk Hartog ...	...	...	...	...
Sharks Bay ...	14	3	6	2
Wooramel ...	33	2	8	2
Hamelin Pool ...	20	2	10	3
Kararang ...	70	4	...	...
Tamala	...	...	...	...
YALGOO DISTRICT:				
Woolgorong ...	25	1	...	...
New Forest ...	...	...	...	...
Yuin	...	...	...	...
Pindathuna ...	..	...	...	...
Tallyrang ...	15	1	...	...
YALGOO DISTRICT—*contd.*				
Bindoo	218	8	...	...
Mullewa ...	135	6	38	4
Kockatea ...	159	7	49	5
Barnong ...	66	3	15	1
Gullewa	91	4	8	1
Gullewa House...	63	3	10	1
Gabyon	56	3	...	...
Mellenbye ...	68	4	4	1
Wearagaminda...	39	3	8	1
Yalgoo	42	1	6	2
Wagga Wagga ...	42	2	...	..
Muralgarra ...	...	...	...	...
Golden Grove ...	45	3	...	...
Burnerbinmah ...	12	3	*Nil*	...
Nalbara	18	2	7	4
Wydgee	...	...	48	1
Field's Find ...	36	4	*Nil*	...
Thundelarra ...	22	2	...	...
Ninghan ...	79	4	...	...
Condingnow ...	...	...	...	...
163-Mile ...	44	...	*Nil*	...
Palaga Rocks ...	...	...	...	...
126-Mile ...	31	...	*Nil*	...
90-Mile	64	...	27	...
Wilgoyne ...	105	5	...	...
Mt. Jackson ...	40	2	...	...
MURCHISON:				
Wale	28	2	...	...
Yallalonga ...	19	1	...	...
Billabalong ...	...	...	...	...
Twin Peaks ...	...	...	...	...
Murgoo	20	1	4	1
Wittenoom ...	15	1	...	...
Meka	15	1	9	1
Wooleane ...	19	1	...	...
Boolardy ...	23	1	*Nil*	...
Yederadda ...	11	1	*Nil*	...
Woogorong ...	15	1	...	...
Manfred ...	...	...	...	...
Yarra Yarra ...	...	...	...	...
Berringarra ...	*Nil*	...	...	...
Miloura	*Nil*	...	*Nil*	...
Mindoolah ...	14	1	...	...
Mt. Gould ...	...	...	...	...
Moorarie ...	4	1	...	...
Peak Hill ...	14	2	4	1
Mebian	11	1	...	...
Abbotts	*Nil*	...	*Nil*	...
Belele	2	1	...	*Nil*

RAINFALL—*continued.*

STATIONS.	SEPTEMBER, 1907.		OCTOBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
MURCHISON—*contd.*				
Gabanintha ...	13	2	*Nil*	...
Bungalow ...	*Nil*	...	...	...
Nannine	12	1	*Nil*	...
Annean	6	1	...	...
Tuckanarra ...	...	..	...	...
Coodardy ...	*Nil*	...	18	1
Austin Downs ...	30	2	...	...
Cue	34	2	6	2
Day Dawn ...	12	1	2	1
Lake Austin ...	29	1	*Nil*	...
Lennonville ...	34	2	2	1
Mt. Magnet ...	24	1	*Nil*	...
Youeragabbie ...	...	...	...	...
Murrum	44	1	...	...
Challa	15	1	...	...
Nunngarra ...	17	2	6	1
Berrigrin ...	...	...	...	...
EAST MURCHISON:				
Gum Creek ...	*Nil*	...	*Nil*	...
Dural	...	...	...	...
Wiluna	13	1	*Nil*	...
Mt. Sir Samuel ...	1	1	9	1
Leinster ...	25	1	8	1
Lawlers	24	2	2	1
Wilson's Patch ...	31	2	14	1
Poison Creek ...	*Nil*	...	8	1
Lake Darlôt ...	...	...	...	...
Darda	15	2	..	...
Salt Soak ...	23	2	15	1
Erlistoun ...	40	1	...	...
Mulga Queen ...	21	3	10	2
NORTH COOLGARDIE GOLDFIELDS:				
Laverton ...	12	1	21	1
Mt. Morgans ...	14	1	...	...
Murrin Murrin ...	18	2	30	1
Mt. Malcolm ...	*Nil*	...	2	1
Mt. Leonora ...	8	1	3	1
Tampa	...	...	...	...
Kookynie ...	16	3	6	1
Niagara	6	1	4	1
Yerilla	...	...	...	...
Yundamindera ..	7	1	48	1
Mt. Celia ...	...	...	..	...
Quandinnie ...	20	1	...	...
Menzies	28	1	25	1
Mulline	25	3	17	1
Mulwarrie ...	42	3	15	1
Goongarrie ...	32	2	17	1

STATIONS.	SEPTEMBER, 1907.		O 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
COOLGARDIE GOLDFIELDS:				
Waverley ...	40	2	*Nil*	...
Bardoc	48	3	11	1
Broad Arrow ...	41	4	11	1
Kanowna ...	30	3	9	1
Kurnalpi ...	34	1	*Nil*	...
Bulong	53	2	11	1
Kalgoorlie ...	42	2	5	1
Coolgardie ...	51	4	15	2
Burbanks ...	45	2	49	2
Bulla Bulling ...	...	...	63	1
Woolubar ...	37	1	...	...
Waterdale ...	47	3	33	2
Widgiemooltha ...	57	7	7	3
15-Mile Condenser	37	2	*Nil*	...
50-Mile	29	...	93	...
Norseman ...	51	4	30	1
Lake View ...	55	4	...	...
Frazer Range ...	*Nil*	...	109	1
Southern Hills ...	...	...	...	...
YILGARN GOLDFIELDS:				
129-Mile	...	...	10	1
Emu Rocks ...	27	1	10	1
56-Mile	92	...	43	...
Glenelg Rocks ...	32	1	13	1
Burracoppin ...	75	3	23	2
Bodallin ...	45	3	*Nil*	...
Southern Cross ...	84	5	3	1
Parker's Range ...	43	4	7	1
Yellowdine ...	90	3	*Nil*	...
Karalee	85	3	...	...
Koorarawalyee ..	91	3	*Nil*	...
Boorabbin ...	103	5	3	1
Boondi	...	...	...	...
SOUTH-WEST (NORTHERN DIVISION):				
Murchison House	71	4	57	5
Mt. View ...	72	6	16	1
Mumby	225	8	72	6
Willow Gully ...	186	11	...	...
Northampton ...	258	6	91	4
Chapman Experimental Farm	200	9	53	5
Narratarra ...	234	8	...	...

RAINFALL—*continued.*

Stations.	September, 1907.		October, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (NORTHERN DIVISION)—*contd.*				
Oakabella ...	200	7	...	...
White Peak ...	...	...	...	...
Geraldton ...	196	11	20	7
Hinton Farm ...	187	6	...	...
Tibradden ...	...	...	...	..
Myaree	217	10	...	...
Sand Springs ...	...	...	...	...
Nangetty ...	164	9	21	4
Greenough ...	176	6	53	4
Bokara	194	8	...	...
Dongara ...	132	10	28	3
Strawberry ...	295	10	75	11
Yaragadee ...	151	8	25	1
Urella	156	6	36	3
Opawa	146	7	36	8
Manara	140	5	30	4
Mingenew ...	199	9	49	7
Yandenooka ...	206	7	51	3
Arrino	179	6	*Nil*	...
Three Springs ...	143	9	29	7
Carnamah ...	95	8	35	5
Hill River ...	269	10	137	10
Jun Jun	102	5	19	1
Watheroo ...	99	7	39	4
Nergaminon ...	...	...	...	...
Dandaragan ...	222	10	93	9
Yatheroo ...	265	8	...	...
Moora	160	9	62	7
Walebing ...	149	12	101	11
Round Hill ...	155	11	51	10
New Norcia ...	171	13	...	...
Wongon Hills ...	97	9	78	10
Wannamel ...	239	11	97	10
Gingin	338	13	170	12
SOUTH-WEST (METROPOLITAN):				
Wanneroo ...	374	13	223	13
Belvoir	393	13	225	11
Wandu	492	19	256	21
Mundaring ...	762	17	343	12
Canning Waterworks	520	14	322	17
Kalbyamba ...	...	...	...	...
Guildford ...	466	17	248	16
Perth Gardens ...	394	18	259	19
Perth Observatory	435	18	289	17
Highgate Hill ...	430	15	280	14
Subiaco	452	19	263	16
SOUTH-WEST (METROPOLITAN)—*cont.*				
Claremont ...	395	14	...	...
Fremantle ...	333	16	216	18
Rottnest	418	17	134	13
Rockingham ...	412	14	301	17
Jandakot ...	478	15	298	15
Armadale ...	471	15	236	14
Jarrahdale ...	787	13	498	14
Jarrahdale (The Chestnuts)	661	17	342	9
Serpentine ...	573	16	311	13
EXTREME SOUTH-WEST:				
Mandurah ...	368	15	311	18
Pinjarra (Blythewood)	437	18	311	18
Pinjarra ...	551	13	393	17
Upper Murray ...	523	20	530	18
Yarloop	533	22	557	18
Harvey	426	23	569	18
Brunswick ...	406	11	647	12
Collie	523	19	385	15
Glen Mervyn ...	425	14	469	10
Donnybrook ...	511	20	497	19
Boyanup ...	494	21	508	19
Bunbury ...	404	20	429	17
Elgin	366	21	503	20
Busselton ...	350	22	423	20
Quindalup ...	427	23	456	18
Cape Naturaliste	383	22	373	20
Glen Lossie ...	360	24	422	21
Karridale ...	571	27	470	19
Cape Leeuwin ...	313	27	355	23
Lower Blackwood	442	20	589	18
Ferndale ...	493	19	615	20
Greenbushes ...	555	21	682	19
Cooeearup ...	439	25	545	22
Bridgetown ...	405	22	480	20
Hilton	416	13	429	...
Greenfields ...	390	8	370	11
Denninup ...	392	8	...	...
Cundinup ...	288	10	...	...
Wilgarrup ...	478	24	611	17
Balbarrup ...	488	13	...	...
Bidellia ...	567	13	642	12
Westbourne ...	324	16	452	16
Deeside	548	19	570	18
Riverside ...	475	16	...	...
Mordalup ...	308	10	...	...
Lake Muir ...	469	18	...	...

RAINFALL—*continued.*

STATIONS.	SEPTEMBER, 1907.		OCTOBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN AGRICULTURAL DISTRICTS:				
Kokardine	70	3	...	...
Walgo	124	9	59	7
Dowerin	104	5	42	4
Uberin	83	5	...	...
Cow-cowing	...	...	...	...
Ejanding	69	3	29	3
Hatherley	...	...	...	...
Momberkine	151	6	65	5
Eumalga	265	11	...	...
Newcastle	193	9	77	9
Craiglands	400	11	215	12
Eadine	275	14	95	9
Chidlow's Well	551	17	303	15
Baker's Hill	235	12	177	9
Berry Brow	332	8	134	9
Northam	172	12	65	9
Grass Valley	134	2	68	2
Cobham	226	15	134	14
York	179	12	86	11
Burrayocking	105	7	47	7
Meckering	82	5	19	2
Cunderdin	162	6	...	...
Doongin	87	6	10	3
Whitehaven	160	6	...	...
Mt. Caroline	71	4	40	4
Quailing	98	9	34	8
Cutenning	99	6	...	...
Kellerberrin	110	4	21	3
Cardonia	83	7	20	4
Baandee	76	4	10	1
Nangeenan	45	2	5	1
Merredin	85	3	22	3
Walgormouring	84	5	...	...
Codg-Codgen	74	5	...	...
Noongarin	66	3	11	1
Mangowine	101	5	...	...
Yarragin	...	...	...	...
Koomberkyne	122	11	73	12
GREAT SOUTHERN RAILWAY LINE:				
Dalebridge	211	10	...	...
Beverley	205	11	107	11
Brookton	207	10	106	11
Sunning Hill	214	15	124	15
Pingelly	246	12	86	10
Yornaning	223	10	•105	13
Narrogin	215	11	122	13
Narrogin State Farm	208	11	84	7

STATIONS.	SEPTEMBER, 1907.		OCTOBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GREAT SOUTHERN RAILWAY LINE—*contd.*				
Rose Hill	191	6	56	4
Wagin	204	12	62	9
Katanning	229	15	107	8
Sunnyside	246	13	138	10
Broomehill	257	12	123	10
Woodyarrup	247	12	115	7
Pallinup	213	7	129	9
Tambellup	239	12	...	...
Toolbrunup	228	9	67	6
Cranbrook	285	14	202	14
Stirling View	222	15	162	13
Kendenup	339	17	374	16
Woogenellup	204	11	170	18
St. Werburgh's	277	20	377	19
Mt. Barker	291	19	346	19
WEST OF GREAT SOUTHERN RAILWAY LINE:				
Talbot House	258	10	115	12
Jelcobine	263	11	120	10
Bannister	353	18	...	...
Wandering	371	16	136	11
Glen Ern	277	12	...	...
Marradong	337	11	163	16
Wonnaminta	234	14	...	...
Williams	261	13	123	10
Darkan	239	5	...	...
Arthur River	273	12	95	9
Gainsborough	240	8	35	2
Glenorchy	336	6	...	...
Kojonup	283	11	...	...
Northumberland Homestead	289	19	305	15
Blackwattle	108	4	...	...
Warriup	361	19	237	16
Forest Hill	383	21	541	21
EAST OF GREAT SOUTHERN RAILWAY LINE:				
Oakdale	256	8	79	5
Barrington	150	5	...	...
Bally Bally	249	10	93	9
Stock Hill	210	8	93	6
Qualin	192	6	91	9
Woodgreen	124	7	...	...
44-Mile	26	1	100	5
Peakaring	116	4	...	...

RAINFALL—*continued.*

Stations.	September, 1907.		October, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of Points. 100 = 1in.	No. of wet days.
East of Great Southern Railway Line—*contd.*				
Glenallan ...	202	13	96	10
Gillimanning ...	189	9	...	...
72-Mile	*Nil*	...	127	5
Wickepin ...	207	11	...	...
Crooked Pool ...	171	6	101	7
Nallyring ...	234	16	121	10
Yardup ..	211	14	115	6
Bunking ...	169	7	73	4
Bullock Hills ...	...	..		...
Dyliabing ...	209	10	. .	..
Glencove ...	198	14	91	11
Cherillalup ...	219	7	...	...
Strathavon ...	198	13	97	12
Warperup ...	259	10	124	14
Woolganup ...	179	9	82	7
Chillinup ...	182	7	...	...
Jarramongup ...	276	7	50	1
South Coast:				
Wilson's Inlet ...	519	20	631	21
Grasmere ...	651	22	607	20
King River ...	444	12	422	12
Albany	559	19	589	20
Point King ...	564	15	592	16
Breaksea ...	513	23	428	24
South Coast—*contd.*				
Woodburn ...	96	2	...	...
Cape Riche ...	272	10	106	6
Peppermint Grove	364	11	198	7
Bremer Bay ...	363	8	202	6
Coconarup ...	141	9	25	5
173-Mile ...	150	.	13	...
Ravensthorpe ...	102	9	15	5
Hopetoun ...	168	13	77	4
Fanny's Cove ...	245	10	44	3
Park Farm ...	304	11	83	10
Grass Patch ...	100	6	62	4
Swan Lagoon ...	92	9	35	2
30-Mile	163	9	30	2
Gibson's Soak ...	237	10	44	4
Myrup	249	12	105	10
Esperance ...	467	10	165	10
Boyatup	413	10	...	...
Lynburn ...	244	10	...	...
Point Malcolm ...	166	14	...	...
Cape Arid ...	...	...	...	...
Israelite Bay ...	110	4	61	8
Balbinia	79	8	...	...
Nannambinia ..	60	7	...	...
Balladonia ...	48	6	50	1
Eyre	41	3	2	1
Mundrabella ...	...	...	...	...
Eucla	21	2	23	3

The Observatory, Perth,
12th November, 1907.

W. E. COOKE,
Government Astronomer.

By Authority: Fred. Wm. Simpson, Government Printer, Perth.

JOURNAL

OF THE

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OF

WESTERN AUSTRALIA.

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NOTES.

Our Subscribers.—We would remind all our subscribers that their subscriptions for the coming year are now due. In order to secure the regular receipt of the *Journal,* the amount due must be forwarded before the January number is issued; failing this their names will be struck off the list.

Dairy Cow Economy.—Within the short space of 24 hours, food materials consumed by the cow become partially transformed into a finished, marketable and indispensable article of human food. At the same time about nine-tenths of the fertilising value of the food eaten by the cow is made ready and returned to the soil to assist the farmer in the growing of other forage crops.

A Modern Poultry Ranch.—In this issue is published an illustration of the Coolgardie Poultry Farm. This establishment is one of the sights of the Eastern Goldfields, and is bidding to reach a premier position in the very near future. Everything is of the most up-to-date order, and all operations are carried on in a scientific manner. In a future issue a more comprehensive report will be published of this modern poultry ranch.

Naphthaline Emulsion.—The following spray will be found to be one of the best for all aphides:—Take 30lbs. of soft soap, and place in copper with sufficient water to cover, and bring to a simmer ; remove fire ; add 3lbs. of napthaline to 1 gallon of kerosene and, when dissolved, pour into hot soft soap and churn the whole violently until it forms an emulsion which, when cool, will set into a firm jelly. Will keep any length of time. When using, take 10lbs. of mixture to 100 gallons of water and spray warm.

Fine Sample of Oats.—We have received a very fine sample of oats from Smith's Mill, grown by Mr. Pratley. They are a heavy feed variety and were grown on new ground that had only been roughly broken up. No manure of any kind had been given the crop. The sample goes a long way to correct the misstatements made that all new ground requires to be heavily manured before it will return a crop. Another fine sample of gigantic oats has been submitted by Mr. S. N. Jones of Gooseberry Hill. They proved to be the common "White Cluster," or "New Zealand Feeding Oats." They do well in cool climates. Other oats of a similar class, such as "Falman's White," "Giant Dakota," "Carter's Prize Cluster," and "Garton's Storm King," have been tried at the Hamel State Farm and done fairly well. The straw, however, is too coarse for good hay, liable to rust and mature late, therefore unsuitable for general cultivation in this State.

* * *

Export of Honey.—At a special meeting of members of the Beekeepers' Association held recently, it was decided to take steps towards the obtaining of a parcel of honey for export. It was pointed out that a trial shipment would do a great deal towards establishing an export trade. After due deliberation it was decided that the honey should be delivered in March next, at a place to be appointed, in readiness for shipment. It was resolved also that the minimum quantity of honey to be contributed to the shipment by individual members should be 120lb., and that the honey would be packed in 60lb. tins. It was further resolved that an association label should be attached to the consignment, with a number for each individual contribution, and that a sample of each quota be retained by the Agricultural Department. It was agreed that the Government should be asked to appoint a tester. In connection with the Franco-British Exhibition, several beekeepers promised to forward exhibits.

Pruning on the Goldfields.—During last season Mr. S. G. Rowbury, the head gardener of the Kalgoorlie Racecourse, gave an interesting exhibition of pruning in Mr. Pascoe's garden at the Boulder. The illustration shows Mr. Rowbury pruning a three years' old peach tree. The growth made is really phenomenal, especially when compared with trees of a similar age in the coastal districts. A large number of members and visitors turned up, about 60 being present, showing what interest is being taken in horticultural matters in the Boulder and Kalgoorlie district and the desire there is amongst the workers there for a further knowledge upon the subject. Mr. Rowbury is a strong advocate of summer pruning or stoping in peaches, nectarines, and apricots especially ; that is, when a young tree is growing vigorously to pinch the young shoots out when it has made 9 inches to a foot of growth, thus checking the flow of sap and causing the back buds to develop into fruit buds, and should the tree continue to show strong growth repeat the process again during the summer. Mr. Rowbury pointed out the effect this would have upon the trees he was operating upon and showed how it would bring the young tree into fruit bearing at least one season earlier than under the old method of leaving all the pruning to be done in the winter. In fact, a peach, nectarine, or apricot properly attended to during the growing period of the year would want very little winter pruning, and also keep the tree low and compact and easier to handle in every way. He also showed how hard back he had to prune some of the trees where they had been allowed to

Mr. Rowberry giving a pruning exhibition at the Boulder (see letterpress p 874)

make long, strong wood shoots, four to six feet in some cases ; and showed the waste of energy of the tree in being allowed to make this useless wood, only to be cut away in the winter, where by summer pruning it would be producing fruit-bearing wood. Mr. Rowbury was closely questioned upon different points which were all satisfactorily answered, which shows the desire there was to learn, and some of those present said they had learnt more in one short hour than from all the books they had read upon the subject. Mr. Ridge, from Mr. J. Brennan's garden, gave a practical illustration of Rose pruning, showing the selection of wood, which to cant away and which to leave, also how to prune for decorative or garden purposes, and for show blooms; and the difference between Teas, Hyb. Teas, and Hyb. Perpetuals, and by request also showed how the budding was done. Unfortunately at this juncture rain began to fall, and, much as we wanted a good rain, we wished it had come at some other time, as it was intended to give a further exhibition upon the vines at Mr. Dawson's, but this had to be abandoned. As a result of the morning outing about 16 new members joined the Boulder Horticultural Society, which is a live and vigorous society, and deserves every possible support.

DEPARTMENT OF AGRICULTURE.

ANNUAL REPORT, 1906-7.

The Hon. the Minister for Agriculture.

I beg to submit the attached reports of the officers of this Department, at the same time I also take this opportunity of briefly reviewing the most salient points which during the period covered since my last report, have marked the Agricultural development of this State.

The co-operation of the staff of this Department in carrying out the duties allotted to each office has made it possible to cope with the great increase of work in a satisfactory manner. When handling stock and initiating new schemes of agricultural development, it naturally follows that unexpected demand is made on the officers. I am glad to report that everyone has helped to expedite the work of the Department.

Functions of the Department of Agriculture.

While the functions of the Lands Department is to put people on the soil and open the country to settlers, those of the Agricultural Department are to see them settled there and turning their land to account, and generally looking after their interests.

Appropriation.

To effect that object the Department receives an annual appropriation from Consolidated Revenue, and is, besides, entrusted with the spending of moneys from Loan Votes, set aside for the development of Agriculture. Although not a revenue earning Department, it contributes in a measure to the public revenue by the collecting of certain fees on stock and produce and returns from State Farms, Refrigerating Works and Markets which come under its administration. These returns have averaged of late about one-fifth of the total amount of the expenditure.

	1905-6	1906-7	1907-8
	£	£	£
Spent from Revenue	49,310	42,646	47,864
Spent from Loan	6,088	10,750	
Total	£55,398	53,396	
Revenue	£9,813	£10,727	*£14,823

*Estimated.

Operations widening.

It is claimed that at a greatly reduced cost, a greater degree of efficiency has been attained.

During the past year the operations of the Department have been greatly increased.

The Perth Markets and one State Farm (Nangeenan) have been transferred from the Public Works Department and Lands Department respectively to the Agricultural Department.

A new Dairy State Farm (Brunswick) has been started for the purpose of affording an object lesson in dairying and of supplying pure-bred dairy cattle to farmers.

The buying and selling of Government live stock has also been transferred from the Public Works Department to the Agricultural Department.

The Department is concerned in: 1, developmental work such as encouragement and establishment of agricultural industries; 2, in research work calculated to solve problems which affect the producing capabilities of the land, investigations as to the nature of soils, water, fertilisers, feeding stuffs, seeds, plants, and other questions of agronomic interest ; 3, in educational work, instructing and advising those in quest of information, training settlers, experimenting with crops and stock; and also 4, in administrative work calculated to protect the interests, more particularly of those on the land, and correlatively those of the State as a whole.

In older countries where agriculture has reached a high state of development that work is carried out by a staff of experienced specialists naturally more numerous than is the case with us, where agricultural development is of more recent achievement.

Acts administered by the Department.

That portion of the work has gradually increased of late years. Every new Act passed by the Legislature to safeguard the agricultural interests of the country adds to the work of the staff as well as to the cost of administering the Department. At present the following Acts are being enforced:—Insect Pests Act, Stock Act, Brands Act, Fertilisers and Feeding Stuffs Act, Diseases in Bees Act, Noxious Weeds Act, Rabbits Act, Wild Dogs Vermin

Act, Commerce Act. Amendments to these Acts are from time to time introduced; weak points and unworkable clauses are by degrees strengthened or eliminated. On the whole these several Acts have been found very useful for the purpose for which they were drafted.

Insect Pests Act.

The attention of the Inspectors under this Act is mainly directed towards preventing pests being introduced from abroad into the State, and suppressing or checking the spread of those pests which have already been introduced and have been detected amongst our orchards and gardens.

Previous to last planting, the area under fruit trees in the State amounted to 12,517 acres, and the area under grape vines 3,525 acres. These figures show an increase of 1,491 acres of orchards and a decrease of 16 acres of vineyards, as compared with the areas for the previous year.

By far the most serious pests we have to fight against is the particular variety of Fruit Fly which for the past ten years, has made its presence known in some of the fruit-growing districts of the State, and notably the Swan and coastal districts.

The Chief Inspector, in his report published below, records the seizure and destruction in auction rooms and fruit shops of 1,287 cases of fruit, worth £400. This loss unfortunately represents but a fraction of the total loss to growers of fruit destroyed at the orchards.

The indiscriminate use of second-hand cases, in spite of repeated warnings, is to a great extent the cause of the new outbreak reported and of the gradual spread of this pest.

Until a remedy, simple in its application and efficacious in its result, is discovered, and until a natural parasite to the fruit fly known to our orchardists is successfully introduced, the pest must spread and extend its damages.

That remedy fortunately seems to have been discovered, and, during the summer months, the fact made known by a resident of Guildford that kerosene attracted and destroyed fruit flies, gives hope that at last we have at our command an easy way of checking the pest.

This Department has already designed specially constructed oil traps to set up amongst fruit trees, and, provided an active compaign is opened early against the first brood of the pest, good results are anticipated.

Several types of these traps have now been made, and will be experimented with early in the season.

Those traps which commend themselves most for their simplicity, their cheapness, and their efficiency, will be recommended, and, if possible, will be made in large numbers and sold to growers in smaller quantities at cost price.

This method of fighting the fruit fly has, since its adoption in Western Australia, received a large measure of attention in the Eastern States, some of which suffer even more than we do from that insect, and kerosene as a weapon will this summer be utilised to a large extent throughout the fly infested orchards of the Commonwealth.

The second method of fighting the pest referred to, by means of its own natural enemies has, meanwhile, received attention, and our travelling Entomologist, Mr. Geo. Compere, is now in India collecting parasites he discovered there, for the purpose of introducing them in the proper season.

Some predatory beetles feeding on fruit-fly larvæ, introduced by Mr. Compere from Brazil, have been liberated in some of the gardens around Perth, but their presence has not yet been made evident.

The Codlin Moth, another serious pest introduced from the Eastern States, which a few years ago was detected in some Perth and some Albany gardens, has, to all appearance, been completely suppressed.

This pest is responsible for the loss of from 5 to 85 per cent. of the apple crops of the orchards of the Eastern States, and of Tasmania.

Drastic measures were taken at an early stage against it, and the results were most satisfactory. Not one single Codlin Moth grub could be found in either of the infested areas at Perth and at Albany during last summer, and the old outbreaks may now be pronounced suppressed.

The San José Scale which, for some years past has been diligently searched for and treated, is now well in hand. The Chief Inspector reports that there are now throughout the State 4,362 trees known to be affected; this represents a decrease of 1,429 trees, as compared with the previous year.

Sprayings in the winter months with lime, sulphur, and salt, with an emulsion of a grade of vacuum oil known as "asphistine," have been used with marked success.

The Mussel Scale, one of the worst pests of apple growers in Tasmania, only exists in this State on 230 trees, and these are under close observation, and are being treated with good results.

Amongst other pests which affect the fruit growers to a greater or lesser extent are the Red Mite, the Woolly Aphis, some bark-nibbling beetles, a few Pear slugs, and two or three fungoid diseases of minor importance.

Good work is being done by our inspectors, who administer the Act with both tact and firmness, and are, on the whole, seconded by the growers themselves.

The suppression of Potato Blight will from now on receive attention, and measures have been taken whereby the introduction of potatoes from New Zealand and countries outside of Australia is prohibited except under strict quarantine.

This step has been taken in common with the Eastern States of the Commonwealth in order to guard against some pernicious blights of the Potato.

The introduction of rooted grape vines continues to be absolutely prohibited, and a few vine cuttings which are now and again introduced are, after a thorough disinfection, are grown in quarantine for twelve months, and after a fresh disinfection handed over to the owners.

The strict measures taken in respect to the introduction of diseased vines have so far spared Western Australia the visitation of the phylloxera, as well as of other troublesome diseases of the grape vine.

Fertilisers and Feeding Stuffs Act.

Until recent years the necessity of using fertilisers in connection with the cropping of the land was not considered as essential to successful farming in Western Australia. Only picked spots were then considered worth clearing and cultivating by the settlers. On such lands yields are always good, and while prices ruled high, the extensive use of fertilisers had not been regarded as necessary to successful farming.

Since then land settlement has progressed apace and stretches of country which for generations past had been overlooked are now eagerly taken up wherever served by railway lines and roads leading to a market.

It was found by experience that on that once discarded land, results equal to those obtained on land apparently better in quality are readily obtained with the stimulating aid of artificial fertilisers. The more arid portions of the State also received attention, and it was demonstrated that unsuspected returns almost invariably attended the forcing of crops by means of the quicker acting phosphates. A demand for that class of fertilisers brought about larger importations of fertilisers, and with competition in the trade, prices came down to an unprecedented level. While the use became more general, the results for reasons then unaccounted for offered at times wide divergencies. Much low-grade manure was at times imported and sold in competition with the higher grade article.

To safeguard the interests of the farmers, an Act was passed making it compulsory on the vendor to register his brand of fertilisers and to sell under a guarantee as regards percentage of fertilising elements. The Inspector of Fertilisers collects samples, which are duly submitted to the Government Analyst, who checks the declaration made. These samples are taken at the stores or while in transit on railways. Whenever the standards fixed under the Act comes short of requirements the permit to sell is withheld. As the results are periodically published goth in the *Government Gazette* and in the *Journal* of the Department of Agriculture, the buyer is afforded an opportunity of choosing the best value for his money. Anyone purchasing fertilisers may also, by complying with the Regulations and by paying the prescribed fee, have analyses made, and receives certificates from the Government Analyst as to the percentage of the constituents of any fertiliser submitted for analysis. Up to the end of the financial year there were in the State 27 firms trading in fertilisers; the number of these amounted then to 136.

The importation of fertilisers which in 1906 amounted to 2,855 tons, valued at £15,005, sprang up in 1907 to 18,556 tons, valued at £63,783. This in addition to the large quantity of bone dust and guano of local manufacture is a clear evidence of the extent artificial fertilisers are now used in the State.

Within the few weeks past, a considerable reduction introduced in railway freights on fertilisers and lime, has been received with due appreciation by the farmers, and it is expected that during the coming year a further striking advance will be recorded in the amount of plant food which will be distributed on the land. The encouragement afforded by the State both in insisting on the quality and in cheapening the transport of fertilisers is already becoming manifest in respect to increased yields of crops as well also as in increased stock-carrying capacity of the land.

On systematically manured land, alternately cropped and grazed by stock, the nature of the natural herbage is rapidly undergoing a transformation. The clover and the more nutritious grasses are spreading in every direction, while the excellence proclaimed for such produce of the West Australian soil as wheat, wool, meat, fruit, etc., is in itself testimony of what is in store for the future.

A good deal of activity is being displayed locally in searching for deposits of mineral phosphates, of gypsum and fresh guano deposits. Very satisfactory discoveries have, during the year, been made at several places of deposits of these fertilisers, and it is reasonable to expect that more systematic prospecting will lead to further valuable discoveries.

The "feeding stuff" section of the Act referred to above has not yet been enforced. As soon as proper arrangements are made whereby the Government Analyst is able to direct investigations in this direction, the sale of feeding stuffs will be placed on the same wholesome basis as is at present the "fertilisers" portion of the Act.

Poultry Industry.

The Poultry Expert refers in a separate report to matters of interest to this branch of the work done by the Department.

One of the most prominent features in connection with the encouragement of poultry has been the holding, with highly satisfactory results, of two egg-laying competitions; the first at the Narrogin State Farm and the second at the Subiaco Quarantine Ground. Both attracted a good deal of attention on the part of breeders and poultry fanciers.

The Subiaco competition achieved great distinction in breaking records, especially in the duck section, which proved successful beyond expectations. During the year arrangements were made to continue for another period of twelve months that egg-laying competition in connection with which important features were introduced.

All the pens entered are as nearly as possible of the same age, and thus a better means of comparison will be possible. It has, moreover, been arranged that a male be placed in each of the competing pens. In this manner poultry-keepers are able to secure settings of eggs of undoubted authenticity and can have their choice of strain at a price which has been kept within reasonable limits.

Eggs to the extent of £64,000 were imported last year. That amount has not greatly varied for the past ten years, and as our population has about doubled in that time, it would seem that we are keeping pace with the demands —proportionately—of our increasing population. With the disappearance of the sliding scale, moreover, prices have decreased, and with this decline in value the consumption of eggs has augmented.

In August, September, and October we overtake the demand, so that the imports of eggs relate to the other nine months of the year. Although eggs cost 7d. to 8d. in Adelaide and sell here for 9d. to 10d. per dozen, local eggs always command a better sale. Cool storage comes to the aid of the egg owner in a very profitable manner. In October last I sent to the refrigerating works some cases of eggs when they were worth 11d. They were sold in May for 1s. 6d. to 1s. 9d. The cost of packing and of storage for the eight months storing was under 3d. per dozen, which left a very fair margin.

Entomologist Branch.

A fuller account of the work done by this active branch of the Department is published with this report.

During the year the Government Entomologist, Mr. Geo. Compere, has been engaged travelling in parts of the world where previous observations had satisfied him that he would be able to collect valuable parasitic insects to introduce with the object of checking our more troublesome insect pests.

In this manner a number of predaceous ladybirds and several internal parasites on scales, red, black, brown, on the cabbage moth, various kinds of aphides, etc., have been successfully introduced.

During the Entomologist's absence the newly-appointed Assistant Entomologist, Mr. L. J. Newman, attends to the reception of the consignments from oversea, the liberation of the useful insects, and their subsequent collection and distribution among applicants. During the year consignments of these useful insects have been received from Japan, China, Ceylon, India, Algeria, and California.

So successful have the introduced scale parasites been amongst our orchards that the periodical sprayings which it was customary to effect only a few years ago in order to clean the trees from these insects, is fast becoming a practice of bygone days. The fruit grower is thus saved the cost of providing chemicals and labour to spray his trees once or twice a year. The imported insects do the work for him, and many growers who used to spend as much as two pounds an acre to spray their trees every year are now saved that expense, and secure cleaner fruit from healthier trees.

The results reported through the introduction of aphis parasites in our agricultural districts and on the Eastern Goldfields are worthy of more than passing notice. The records of this department show that crops of cabbages, cauliflowers, and turnips, which were thickly infested with aphis, were in the course of a few weeks freed as if by magic, consequent upon the introduction in a number of gardens of suitable parasites collected by the Assistant Entomologist and mailed to the applicants. This result is very gratifying in view of the fact that it makes possible the cultivation in the field of such cruciferous crops as rape and turnips during the spring months of the year, in the moister and cooler South-Western districts. By reason of the ravages of the aphis insects on this class of plants their cultivation had hitherto been restricted to the winter months alone, when the pest is dormant. One thus realises the possibilities offered to stock-owners who are turning attention to sheep-farming for the production of fat lambs for export.

During the year 516 colonies of beneficial insects have been distributed throughout the State, and the results achieved are reported as being very satisfactory.

At the present moment, Mr. Compere is engaged in travelling abroad for the purpose of locating and securing suitable parasites to attack the particular kind of fruit fly maggots (*Ceratitis capitata*) which for the past ten years or so has been regarded as the most destructive pest we have yet had in this State. At the same time he is also on the alert respecting parasites of such pests of the woolly aphis of the apple tree and the potato moth, which continues to be very troublesome during the summer months.

Arrangements will be made for the introduction of the fig caprifying wasps. Some years ago, with the co-operation of Mr. Compere, I introduced from California the noted drying figs of Smyrna, together with the wild Capri figs, which harbour the caprifying insect which is instrumental in effecting the fertilisation of that fig.

The trees have been planted at the Hamel Experimental Farm under the care of the manager, Mr. G. Berthoud, and are doing very well. They have now reached the fruiting age, and in order to secure the ripening of the crop, the Blastophaga wasp is now necessary, and will be introduced into the plantation.

Mr. Compere is, by mutual agreement with the State of California, engaged on work beneficial to both States. He cost us last year £440. His work is of very great importance to the whole of Australia. An effort made to enlist the practical co-operation of the Eastern States in sharing in the cost of the work undertaken for the benefit of all has failed to meet with response.

Noxious Weeds Act.

This Act which superseded some years ago the Scotch Thistle and Spanish Radish Act, directs its attention to the extirpation of noxious plants of foreign origin which have been accidentally introduced into the State, and which threaten to injuriously affect crops, pastures, or stock.

A noxious weed under this Act is not necessarily an undesirable plant which may invade farms and settled country, but a few such plants only which it is deemed advisable to suppress and keep in check.

Whenever it is deemed desirable to bring a particular weed under the scope of the Act it is usual for a local body to make a recommendation to that effect to this Department. On receipt of such recommendation the application is submitted to the Advisory Board of the Department of Agriculture, when full consideration is made into the merits of the case. It then rests with that board to recommend to the Minister that the plant brought under notice be declared a noxious weed, when the Executive Council is moved to give effect to the recommendation.

In this manner the following plants have from time to time been gazetted as weeds under the Act:—Double Gee (*Emex Australis*), Northam Municipality; Nut Grass (*Cyperus rotundus*), throughout the State; Bathurst Burr (*Xanthium spinosum*), throughout the State ; Noogoroo Burr (*Xanthium strumarium*), throughout the State; Stinkwort (*Inula graveolens*), throughout the State; Spanish Radish (*Raphanus raphanistrum*), throughout the State; Prickly Pear (*Opuntia vulgaris*), throughout the State; Wild Bramble (*Ribes fructicosus*), throughout the State; Sweet Briar (*Rosa rubiginosa*), throughout the State.

The Act has not been administered with the stringency that the suppression of the weeds named always demand. Although on the Statute Book it has not hitherto been found possible to make on the Estimates provision for its administration which, to be thorough, must necessarily be costly.

In the case of some of the weeds named, action was so long delayed that it has, unfortunately, become evident that little practical good must now follow the cost of eradication, and indeed, it is questionable whether that aim can now be successfully effected. In the case of others, where climatic influence and environment, to a great extent, control the spread of the plant, it is imperative to take prompt action in some districts, while it is immaterial in others, where conditions are unfavourable, to take much heed of the presence of the plant.

For instance the Nut Grass, a pest on alluvial flats subject to periodical floods, ceases to be troublesome on higher ground. The Wild Bramble and the Sweet Briar, which delight in the cooler and moister South, may be overlooked in the hotter north of the State.

The Prickly Pear, on the other hand, which is likely to cause much trouble in hotter latitudes, will not readily spread in the cooler parts of the State. It follows, therefore, that the Act is one which must be administered with much discrimination, and that each case must be dealt with according to circumstances influencing the spread of the weeds named. It is fortunate that the Bathurst Burr and the Noogoroo Burr, which cause extensive depreciation in the value of wool in some parts of Australia, have not hitherto made any appreciable inroad in Western Australia. The Prickly Pear has only been reported to be causing some uneasiness in one portion of the State, in the vicinity of Roebourne and Cossack. The Roebourne Roads Board, which has at last become alarmed at the probable spread of the weed, has been invited to co-operate with the Department in destroying the plant in that locality, and, with that object in view, the assistance of the prison authorities has been enlisted.

As settlement increases in the Southern Districts the bramble and the briar will give trouble unless settlers from the start recognise the danger of overlooking the presence of these plants, the seeds of which are carried by birds.

The Spanish Radish, a troublesome weed in cornfields, is, to a great extent, kept in check wherever bare fallow and sheep find a place in the operations of the farm.

The Double Gee and the Stinkwort are more troublesome to cope with, and on account of their profuse seeding characteristics, are most difficult to master. In districts where they have already obtained a footing every effort should be made to persevere in their suppression.

The Brands Act

Has for some time past been under consideration and in order to better enforce its provisions, it is sought during the present session of Parliament to amend it in several minor respects.

The earmarking of cattle, which appears to have been an oversight in the original Act, will be provided for. The earmarking of sheep for age will be reduced from seven to six, thus dispensing with unnecessary punchings of the ears.

An amendment to cancel old registrations under the previous Act (1881) is receiving consideration. This would operate from January, 1909, and will prove a safeguard against tampering with brands. It will also bring uniformity in methods of branding in recording registrations under the proposed amendment ; imprisonment is provided for under certain conditions, left to the discretion of the magistrate.

Under the new Act, brands consist of two letters and a numeral, a method which admits of endless combinations.

The registration and transfer of stock brands show a considerable increase on those for the previous year. This in itself is indicative of the extension of stock raising in the State.

Commerce Act.

This Act, a Commonwealth measure, is to some extent, although under the Customs, administered by the Department of Agriculture in so far as it deals with the trade, description of exports of fruit, meat, etc. As this Act prescribes the use of Commonwealth forms and stamps, the officers of the Department connected with the export business will have to be appointed officers of the Federal Government in order to legally act in regard to inspection, grading, branding, as determined under the Act.

Fruit, meat, leather, and honey for export were during the year brought under the operation of this Act. In so far as fruit is concerned, the certifying officer affixes on the covering case a brand giving a true description of the goods, *e.g.,* " Apples," "Pears," " Fruit Pulp,' etc., the name of the State were produced, the net weight or quality, *e.g.,* one bushel or "48lbs.," etc. The full registered trading name of the manufacturer or exporter, or his registered brand (both the names of the manufacturer or exporter and his registered brand may be used, but an unregistered brand cannot be used. The foregoing particulars may be enclosed in a design if desired or may be put on plainly. The goods must be sent to an appointed place or to a wharf for inspection and an advice note as to the probable time of arrival of the fruit should, if possible, reach the officers at that place before the arrival of the goods.

The officer thus inspects the fruit, and if satisfied that it is sound (free from disease), issues a certificate to that effect and impresses the Commonwealth approved stamp and the number of the certificate on the outer covering.

Meat, for export, in a like manner undergoes a searching inspection first from the meat inspectors, who certify to its wholesomeness. It is then graded by the certifying officer, who affixes the prescribed Commonwealth stamp which makes it eligible for export. That grading is carried out according to weight. This Department is anxious that it should also be done according to quality. For instance, in the fat lamb export trade the standard weights run from 24 to 48lbs. and the grading is done according to weight. Among the medium-weight grade, it is possible, under the present system, to find lambs varying in shape and size, some chunky and well topped, others long and thin. If the grading were done according to quality, greater uniformity would prevail, and if each grade were sold under a distinctive registered trade mark, irrespective of owners' brand, the buyer would be better able to secure what he wants, and the trade would be established on a firmer footing.

Some advocate that nothing but a uniform grade of fat lambs be exported. It is clear that there cannot be compulsion in this matter, and neither the Commonwealth nor the State can direct that only one class of lambs must be exported and no other. Registered trade marks, however, by defining the conditions the carcase must fulfil for admission under the several grades referred to, would enable the seller to gauge the price he is likely to receive, and the buyer the quality of the goods purchased.

The following definition of suitable export lambs from the cold storage man's standpoint, is given by Mr. A. D. Cairns, the manager of the Government Refrigerating Works:—" A lamb of three to five months old weighing alive sixty to ninety pounds, the former dressing a shade under thirty pounds and the latter about forty-three to forty-five pounds. A pound or two either way will not matter."

Cool Storage.

The large dimensions now attained by the cattle industry of the northern portion of this State; the fact that another large portion of Western Australia has now been proved to be so well suited for lamb raising; also that the southern portion of this State rivals the most favoured parts of Australia for apple growing; have now given to the question of cool storage a share of attention it had not hitherto received at the hands of the Government. The necessity of suitable cool stores as a necessary precedent to the expansions of the meat, the fruit, and the dairy trade, is readily admitted.

The State Refrigerating Works have, during the year, done much to popularise this method of preserving perishable products. In his annual report, the manager of these works submits interesting details bearing on the work done on behalf of the producer.

The question, however, of affording these facilities on an enlarged scale in other localities has received full consideration, and in turn the shipping ports of Wyndham, Fremantle, Albany, and Geraldton must be fully equipped with freezing works commensurate with the class and extent of trade in sight, within the next few years. The State works, as well also as different private works, have hitherto handled the perishable produce for the local as well as the export trade at both Perth and Fremantle, and these works have until now fully answered our requirements. In the far north, however, it has now become evident that cattle-raising is seriously hampered for the lack of adequate meat works.

In order to afford relief and insure the establishment within the State of works designed to cater for the local trade, as well as for oversea markets, the Government has, out of moneys voted for the development of agriculture, offered to advance a sum of £35,000 on the pound for pound basis to a company desirous of erecting freezing works at Wyndham to handle and export the surplus stock of the North-West. The offer has been favourably received by cattle owners interested, and the question of erecting meat works capable of dealing with 100 head per diem is now under study.

One of the conditions attached to the scheme makes it possible for the owners of the smaller herds to have their fats as well as their culls treated at the works on the same terms as the owner of the larger herds who now charter their own boats and ship their own cattle.

The extent of the cattle trade of the Kimberleys is now fairly considerable, over 20,000 head are landed annually from the North-West at Fremantle, West Kimberley contributing to that number 14,500 head, which are shipped from the port of Wyndham alone, and West Kimberley 4,400, shipped from Derby.

These, in conjunction with other local supplies from the South-West portions of the State, meet present local requirements.

As, however, it is computed that some 100,000 calves are annually branded on the North-East stations, it is readily seen that, assuming that 80,000 of these reach the age when they can be slaughtered, there still remain on the runs, after deducting the number shipped to southern markets, some 60,000 head, and at that rate over-stocking must soon lead to steps being taken to deal with the steadily increasing surplus.

Indeed the expansion of cattle raising is so rapid in the Kimberleys, that it is natural to foresee that within a few years the cool storage facilities it is intended to provide at Wyndham will have to be established at Derby.

It is a matter for regret that until facilities are provided for converting the surplus of the Kimberley herds into marketable commodities such as export meat, tallow, hide, blood and bone manure, the natural increase of these herds is checked instead of being encouraged.

One firm alone, which controls several large cattle stations in the Kimberleys have, it is said, issued instructions for 40 per cent. of the heifer calves on their stations to be speyed, and rendered incapable of breeding.

This important industry is now conducted on wasteful lines. On every station there are at present a number of bullocks and old cows unfit for market which encumber the pastures, and should, instead, be turned to better account for the hide, tallow, and manure, they are susceptible to yield.

Those in the trade complain also of the loss attending the droving of mobs of fat clean bullocks long distances to the sea board, through tick-infested low country; also of the heavy mortality which at times attends the packing of heated fat cattle in close, cattle ships.

Even under the most favourable conditions an amount of wastage by no means negligible, always takes place in the course of the voyage down the coast, and also during the time the cattle are held in quarantine after landing. That waste is estimated at about 1cwt. per beast, and as it is always the tender meat which melts away first, it follows that the cattle, on landing, have lost much of that bloom which they show when fresh from their pastures.

It is estimated that the cattle of the North can be treated at the pastures and shipped to Fremantle in the frozen block by the ton at about 10s., whereas at present they are shipped alive, under great risk and hardship, at a cost of about £3 per live beast.

While the question of meat works, with attendant cool storage works, for the betterment of the cattle raising industry is receiving attention, the export of fat lambs has this year been undertaken on commercial lines with every promise of a rapid expansion in seasons to follow.

Graziers and farmers are giving attention to the breeding of the right class of lambs for export, and there is every indication that the same progress which has marked the rise of this paying industry in the Australian States and New Zealand will be recorded in Western Australia.

The fruit export trade has also this year been entered upon on a scale which holds out bright promises for the future. The efforts of this Department, for some years past, to demonstrate the possibilities of this trade for our apple growers has, during the past year, been largely supplemented by private enterprise. Several firms have collected and shipped fairly large parcels of apples with results so far satisfactory to the growers that henceforth West Australian fruit will each year appear more prominently among our list of exports.

Cool storage has, in this case, largely helped to establish this industry, and the interesting notes supplied by the Manager of the Government Refrigerating Works will prove interesting reading.

In order to familiarise our growers with advantages of cool storage this Department has, during the past season, undertaken to store small lots of fruit, mostly apples and pears, at a nominal cost per week.

Parcels of cases consigned to the Refrigerating Works by agricultural societies were stored free and returned when the fruit commenced to show signs of decay, for the inspection of members.

A number of growers besides have stored fruit in lots varying between 100 and 1,000 cases; with very few exceptions, results have been as satisfactory as could be expected, and it is anticipated that during the coming season our available space will be fully taxed in order to find room for the fruit intended for cool storage. A number of cases of fruit from larger lots placed in the cool chambers on the 26th March last were taken out on the 26th October and placed on exhibition in the pavilion of the Department of Agriculture at the recent show of the Royal Agricultural Society.

That fruit worth, when admitted, about 8s. a case, was sold, after seven months storage, for 20s. to 22s. case ; the storage charges for the 29 weeks amounted to 4s. 10d., the net profit to the owner, after providing for a slight waste, being 14s. to 15s. a case, or about double the value of the fruit when it was handed over to the care of the manager of the works.

Two years ago there were perhaps 40 to 50 cases of fruit in cool storage, last year 14,000 to 15,000 cases were stored.

New Markets for Fruit.

The satisfactory reports transmitted by the Agent General in London of the success which has attended the marketing of West Australian apples are still too fresh in the mind to need repeating.

Although the European market will, we are assured, absorb all the export fruit we will produce for many years to come, yet other markets closer to our ports also deserve attention. Colombo, within a few days of our chief port of export, naturally suggested itself as a centre where our fruit could profitably be shipped. The experiment tried in June last met with very satisfactory results. Through the good offices of Mr. G. S. Yuill a consignment of apples was, by direction of the Minister, shipped to Colombo.

The fruit was sent as ordinary cargo by mail steamer at a cost which is only a fraction of cool storage freight, and was, on arrival, received by Messrs. Lewis, Brown, & Co. and duly sold, the apples realising the sum of 8s. 6d. per case net. A portion of the consignment was distributed amongst leading clubs, hotels, and cold storage works, and brought forth most complimentary remarks.

Oranges sent later in the season did not meet with the same success.

The manager of Messrs. Cargills, Ltd., reports:—Messrs. Lewis, Brown, & Co. informed us that in his opinion the oranges were excellent, but the prices were much too high for Ceylon, there being very little demand for such a high-priced orange. In order that the shipment might show a profit, the oranges are being disposed of at 3Rs. per dozen, or 25 cts. each. As a very fair Ceylon orange can be purchased for 6 cts., you will readily understand that the demand for oranges at 25 cts. each is limited.

During the next two years—1908 and 1909—the fruit available for export will, on account of the local demand, which still ensures high prices, be somewhat limited, and it is unlikely that we will ship more than 5,000 to 6,000 cases. From that time on, however, unless a large increase takes place in the population, it is safe to estimate that our fruit export will increase annually for some years to come at the rate of about 20,000 cases annually.

The cheapening of the cool storage freight on fruit will, under the new Federal Mail Contract, prove of great advantage to exporters. The present high rate of 75s. per ton of 40 cubic feet will, under the new arrangement, be reduced to 60s. per ton, taking 23 bushel cases. The more rapid transit expected and the larger cool storage accommodation provided will also greatly assist the fruit export trade.

Fruit and Fruit Trees Imported during the year.

Tropical Agriculture.

The potentialities of our North-West country has hardly yet been realised as a profitable field for the investment of capital, except as regards cattle raising.

Inquiries, however, are being constantly made, and much information being accumulated against the time when a systematic start will be made.

Experimental work has already been arranged for, especially at Beagle Bay, where most encouraging results have attended the enterprise of the Trappist Mission established there.

Interesting information has also been recorded on a smaller scale in the neighbourhood of Broome and Derby.

It has been ascertained that cocoa-nuts, bananas, pine apples, mangoes, rubber, cotton, tobacco, and many other tropical growths find congenial surroundings up North.

To Mr. Isdell, the Department is indebted for much valuable information contained in letters full of interest and practical knowledge on the subject, gathered from his long experience there.

A marked impetus is anticipated from the passage of the Federal Bounties Bill, which affects that portion of the State thus:—

Cotton (ginned), £6,000 a year for 8 years, 10 per cent. on market value.
Flax (New Zealand), £3,000 for 10 years, 10 per cent. on market value.
Flax and Hemp, £8,000 for 5 years, 10 per cent. on market values.
Jute, £9,000 for 5 years, 20 per cent. on market value.
Sisal Hemp, £3,000 for 10 years, 10 per cent. on market value.
Copra, £5,000 for 15 years, 15 per cent. on market value.
Cotton Seed, £1,000 for 8 years, 10 per cent. on market value.
Linseed (Flax seed), £5,000 for 5 years, 10 per cent. on market value.
Olives, £2,500 for 15 years, 10 per cent. on market value.
Palm Fruit, £3,000 for 15 years, 15 per cent. on market value.
Peanuts, £5,000 for 5 years, 10 per cent. on market value.
Sunflower Seed, £2,000 for 5 years, 10 per cent. on market value.
Rice (uncleaned), £1,000 for 5 years, 20s. per ton.
Rubber, £2,000 for 15 years, 10 per cent. on market value.
Coffee (raw), £1,500 for 8 years, 1d. per lb.
Tobacco Leaf, £4,000 for 5 years, 2d. per lb.
Fish, preserved in tins or casks, £10,000 for 5 years, ½d. per lb.
Dates, £1,000 for 15 years, 1d. per lb.
Dried or Candied Fruits, exported, £6,000 for 5 years, 10 per cent. on market value.
Wool, combed or tops, £10,000 for 2 years, 1d. to 1½d. per lb.

State Farms.

At the beginning of the year the Department had under its control three State Farms, viz., situated at Narrogin, along the Great Southern Line; Chapman, in the Champion Bay District, and Hamel, along the South-Western Line. A little later the Nangeenan Farm, along the Eastern Goldfields Railway, was transferred from the Lands to the Agricultural Department, and at the same time a portion of a re-purchased estate near Brunswick

Junction, along the South-Western Line, was vested in this Department for the purpose of creating a Dairy Farm.

In order to personally investigate the position and prospects of these farms you undertook, as Minister, during Parliamentary recess, a personal visit of inspection. The outcome of that visit has enabled this Department to introduce reforms for the conduct of these farms on lines more in accord with the object for which they were originated, and radical changes were introduced in the management. Students were then received at two of these farms. They have now all been concentrated at Narrogin where new quarters have been erected for their accommodation. There were at the beginning of the financial year 16 students at Chapman, and 15 at Narrogin. The scheme of amalgamation now effected has brought up the number of students at Narrogin to 40. The fees of £2 2s., which were until recently charged for admission and maintenance, have since been raised to £10 per annum. This step was taken in order to ensure the admission of a class of student more genuinely concerned in gaining experience in methods of farming suitable for the conditions which prevail in this portion of Australia. The working staff, which in June last numbered five at Chapman, with six immigrants besides, has since been reduced to three only, including the manager ; while the acreage of cropped land has during the same period increased about 25 per cent. The farm stock has also been increased, and it is proposed, on the land becoming capable of carrying more stock to increase both the herd and flock.

At the Narrogin Farm, the number of hands on the pay sheet in June, 1906, was seven, and has been reduced to one foreman only, while, by reason of the increase in the number of students the strength of the Household Staff has been increased from two to four. All the farming operations are conducted by the students themselves, working under the direction of the Manager, the Assistant Manager, and a Farm Foreman. During the year the old worn out stock was sold off both these farms and replaced by more effective horses and machinery.

A new stable and barn combined was erected at the Narrogin Farm in close proximity to the new quarters and an overhead wooden silo has also more recently been erected and filled with a fodder crop grown purposely.

By degrees the mixed stock on State Farms is being disposed of and replaced by pure bred animals, with the object of raising a class of horses, cattle, sheep, pigs, and goats and poultry for disposal to farmers in need of pure bred breeding stock.

At both these farms and also at Nangeenan State Farm a practical object lesson in wheat growing on fallow land is being provided. For that purpose, one ploughman equipped with a good team of four horses, three-furrow stump jumping plough, set of harrows, drill, and harvester, has been given the task to sow the seed, plough, and cultivate the fallow land for the next season and harvest the crops. The only assistance given him is in carting the crop off the land. By keeping abreast of the seasons and continuously applying himself to the work outlined, one man can thus, during the course of the twelve months, cultivate one square mile of wheat land, half of which is every alternate year seeded and harvested, while the other portion is ploughed and cultivated and prepared for cropping in due course.

The improvement of the natural pastures by means of liming and top-dressing with chemical fertilisers has been attempted on a scale large enough to make the advantage of thus treating land convincing to stock owners. The results, as anticipated, have been very satisfactory, and, as time goes on, a still more noticeable change in the pastures will be recorded.

Concurrently with this method of improving grass land, special crops have been grown and fed to stock. The result has been highly satisfactory as far as the condition of the stock is concerned, and marked permanent benefit to the land will thus be reflected in following season's crops.

The experiments with winter fodder crops have been most satisfactory as regards turnips, which have proved particularly adapted to withstand our rainy winters, and, on the wet shallow land, have been found more reliable as a fodder crop than is rape or field peas.

Malting barley has shown to be a profitable crop at the several farms, and is well adapted to the conditions to be met with over a wide extent of our farming country.

The earlier ripening wheats, and, amongst others, two new kinds, Alpha and Australian Cross-bred No. 73, bred by Mr. Geo. Berthoud, the Manager of the Hamel Experimental Farm, have gained favour when compared with other well known wheats, as regards yield, reliability, and hardiness.

The hard wheats of the Macaroni class, specially introduced for testing in the field, have not so far proved superior to our better known kinds of wheat, and it is not certain whether they will be acceptable to millers.

Of the oats, "American Early Ripe" have given the best returns at the Narrogin Farm. That cereal seems, in wet seasons, to yield better returns than the other kinds of oats in that portion of the State.

On the poorer sandy soil rye has been grown for grazing, and has been found a most useful crop which, by careful husbanding, can be fed down several times in the same season. A portion of the crop grown for ensilage was cut when six feet high and when in the early grain-forming stage. A demand for the straw for collar-making has been met. The rye crop is one of the best adapted to vast stretches of sandy lands in this State, and invariably yields heavy crops. That grain is in good demand on the Continent of Europe, and it is intended to raise a crop to test that market next year.

The rise in the price of hessian bags from 6s. to 8s. a dozen—constituting a charge of 2d. per bushel on four-bushel bags of wheat—has proved a heavy impost to farmers, more especially in the early part of the season, when wheat was selling at the lowest price yet experienced in Western Australia, large parcels being then disposed of on trucks for 2s. 5d. to 2s. 9d. per bushel.

Storage of corn in bulk will, during the coming season, be introduced at least at one of the State Farms, and a design has been prepared of a corn bin made of local wood capable of storing 1,000 bushels of wheat. Internal partitions will, as required, be used to separate the several kinds of wheat. The bagged, dumped corn on the ground in the field by the harvesters will be carted to the bin, where the contents of the bag will be emptied into the traps at the top of the bin direct from the dray. It is expected by this method to save the cost of the bags until the wheat is actually sold ; damage by rats and mice will thus be obviated, while the means of suitable treatment by fumigation when weevils might be expected can be successfully carried out.

Fibre.—Other experimental crops grown with promises of financial success are fibre producing plants. Of these three are being experimented with viz.:—

New Zealand Flax on the damp at Hamel,
Sisal Hemp at the Chapman Farm,
Linseed Flax at the Narrogin Farm.

The first two require a few years to bring to the profit reaching stage.

The Linseed Flax is one better adapted to taking a place in the ordinary course of rotation on wheat farms. The textile plant, of which a trial crop was sown at Narrogin, is one well suited to much of our farming country where winter rains average from 25 to 35 inches, and where light loamy soil overlies a heavier clay subsoil. The Russian Riga, with blue flowers, is probably the hardest kind, while the white-flowered Belgian offers the advantage of being earlier ripening, thus escaping the devastating spring grubs when the seed capsules are forming. One to one and a quarter bushels of seeds (56 to 70) are either drilled in or broadcasted per acre in the autumn, and five to six months after, in the early summer and just before wheat is harvested, the crop is either cut with the reaper and binder or pulled by the roots. The latter method, though slower and more costly, yields some 3 inches of fibre more than when the plant is cut, and the heavier amount of fibre obtainable in a measure compensates the greater outlay in harvesting. We have now at Narrogin a stack that will in due course be threshed in order to separate the seeds, when the fibrous stalks will be retted by exposure for some weeks out in the field, where the night due alternating with the sun helps to better separate the fibre from the gummy substance of the stalk. When this object has been duly achieved, the bunches of flax are scrutched or beaten by machinery, and the fibre is then baled and placed on the market. The whole operation of raising and of preparing for market costs from £6 10s. to £7 10s. per acre, while the gross return from both seed and fibre, worth 7s. per bushel and 15s. per cwt., amounts to some £15 to £16 per acre for an average crop.

Sisal Hemp is also receiving attention. Trial plantations of several kinds have been established at the Chapman Farm, while a good deal of inquiry concerning that crop has been made from private sources. Quotations and arrangements have been made both in Queensland and in Mauritius for sets of aloes of suitable kinds, and it is expected that important plantations will be established during the next season.

During the year measures have been taken to restore the Chapman Farm to the object for which it has been created ; that of affording an object lesson in demonstrating the value and capabilities of land in that portion of the State. As previously stated in this report, the Students were withdrawn from this farm, which is now worked by a Manager and two assistants. The result so far shows that, with a considerable reduction in the number of hands, and consequently at a great reduction of the cost, a much larger acreage has been cultivated and cropped. The ground for next year's seeding is already prepared and lying fallow. The crops are reported to compare, on the whole, with the best in the district, and the yield at harvest is coming up to estimates made at an earlier period. The stock on the farm has been increased, and numerous applications come every week to hand for Suffolk Punch colts, Dexter-Kerry cattle, Angora goats, Berkshire and Large Black pigs, and for the supply of pure seed wheat raised on the farm and recognised as suited to that part of the country.

The Nangeenan Farm has, as also stated, been recently transferred from the Lands to the Agricultural Department. As soon as that transfer was effected, provision was made for increasing the area of land it is intended to bring under cultivation. That area will consist of as much as one man having command of a team of horses in good working order, and of all the necessary farm machinery, will be able to sow, reap, and fallow for the next season's crop.

Interesting experiments are being conducted at the farm by the Manager in determining which are the most reliable and most profitable kinds of wheat to sow in the drier belt of country with an average of from 9 to 11 inches of rain falling during the growing months—between May and October. This year " Alpha," " Gallant," " Australian Cross-bred No. 73," " Rerraf," "Baroota Wonder" have surpassed the yields of "Yandillah King," which last year give very gratifying results.

It is evident that in order to draw sound deductions and pronounce with any degree of accuracy as regards the best kinds of wheat to grow in districts where the rainfall is rather too scanty or excessive, or where other conditions arise which may react favourably on the year's operations, practical observations and a system of records covering a reasonable number of seasons must be previously registered.

Barley, a quicker growing crop than wheat, promises to yield good results at Nangeenan and the country round.

The Lucerne plot, established in close proximity to the Goldfields Water Supply main, from which water is drawn for irrigation, affords a useful object lesson, worthy of imitation by the hundreds of farmers who now have their homesteads along the pipe track running through fertile country until recently unavailable for settlement for lack of permanent water. What is being done at Nangeenan can be done at any of the farms along the pipe track. A plot of lucerne, only a quarter of an acre, or even less, would, on the deep loam, rich in lime and in fertilising elements, once under Salmon and Morrel gums, be of considerable value to all kinds of farm stock, and more particularly dairy cattle, pigs, and horses.

One of the most striking features of the reclaimed forest land referred to is the luxuriant growth of native grasses, which take possession of the soil almost immediately after ringbarking. Some of these grasses, which grow to a height of twelve to twenty-four inches and more, have been submitted for botanical classification. They belong to the *Stipa* family, which is widely distributed in other dry countries besides Australia. In the drier portions of Algeria and Morocco a coarser kind of *Stipa* covers very extensive tracts of country, and has been, for a considerable period, exported under the name of " Alpha" to paper mills and rope and carpet factories.

The Australian representatives, so common through the drier portions of our Salmon gum forest, is possessed of nutritious properties which are strikingly brought in evidence by the fine condition of all kinds of farm stock browsing on it.

Other grasses, particularly some of the Trefoils, and a kind of Canary grass introduced by travelling stock, are rapidly spreading over the reclaimed fields and add to their value for stock raising.

It is proposed improving the feeding capacity of that country by ringbarking and cultivating to conserve, in the early spring with the aid of silos, large quantities of fodder, and thus carry a greater herd of stock at a lesser risk.

It can confidently be said that with the early pioneers of Nangeenan, this State Farm has now demonstrated the possibility of conducting mixed farming to a successful issue in a tract of country hitherto considered too arid for agricultural settlement.

The State owes to the Goldfields Railway and to the Goldfields Water Supply the addition of a fertile province to its vast agricultural country.

The most recent addition to the farms controlled by the Agricultural Department is the new dairy farm at Brunswick.

It is a portion of the recently re-purchased Perin's Estate, now offered for closer settlement.

The locality has always been considered one of the most favourable yet made available for dairy farming, being situated in a mild and moist climate, and served by the South-Western Railway, which makes it possible to rapidly carry dairy produce to market.

The ground consists partly of rich, deep alluvial soil, on the banks of the Brunswick River, and partly of a higher clay plateau, of little value in its present unreclaimed state, but which when cleared, cultivated, and drained where required, should prove capable of growing good crops, and carrying a heavy head of stock. To demonstrate that purpose the manager will apply himself as soon as the farm is sufficiently organised to commence work with some amount of system.

Pure bred dairy cattle, and also pure bred pigs will be kept on that farm. Very little, if any fodder at all, will be purchased for them.

It is not intended to have more than a couple of students on the farm, and the maximum amount of useful work will be expected from the farm hands, assisted by milking machines, up-to-date appliances, and efficient equipment of a dairy farm.

A record will be kept of each cow milked, so as to permit the culling of wasters, and also supplying to those desirous of buying young stock, an opportunity of gaining some information regarding the value of the animals from which they are issued.

It is intended to hold annual sales of the surplus stock at a time when it will be possible to form some idea of the value of the young stock offered for sale.

A succession of root and green crops will be maintained on the farm, and a small irrigation plant will also be used for the purpose of growing under irrigation in the summer time such crops as lucerne, maize, and mangels, etc., for the use of the stock.

Development of Dairying.

Particular attention has been directed to the means of establishing the dairying industry on a sound basis. For that purpose a Dairy Expert possessed of a knowledge of the requirements of the industry and of the conditions which influence it in Australia has been engaged. Mr. J. A. Kinsella, who has in turn taken an active part in the establishment of dairying in Canada, New Zealand, and the Transvaal, has been engaged to instruct farmers, and so direct their efforts that they will be saved making, at the start, mistakes often made for want of timely advice and experience. Western Australia at present lags far behind the other Australian States in the matter of dairying. The number of dairy cows in the State in 1906 was 16,814, 1905, 35,011.

Although our dairy herds have more than doubled in the past ten years, we still require further large additions before we cease to depend on imported dairy produce to meet our local requirements. In order to supply from our local production the 52 tons of butter a week now imported, we require at least another 35,000 cows, allowing for cows going dry and not in profit. Last year we imported £340,356 worth of butter, and £27,758 of cheese from the Eastern States alone. Thus, more than £1,000 per day, that is going to support in the other States an industry there, we could keep here for ourselves and circulate in this State. In order to check this costly drain, an effort is now being made by the Government to stock up the farms, and before the end of the year 500 selected dairy cows, in full profit, most of them at their second and third calf, will have been introduced from South Australia and Victoria. Enquiries are also being made for the introduction of a number heifer yearlings, picked amongst calves from good dairy farms in the Eastern States.

A number of farmers are not ready yet to give the necessary attention to dairying, but expect in a year or so, when these young heifers would calve to be able to take up that industry and start on well acclimatised stock, bought at a comparatively small cost.

The imported cows are now sold to farmers on two years' terms, in eight quarterly payments with interest at 5 per cent. added. As a number of cows are thus placed in our agricultural districts, it becomes necessary to provide suitable bulls of the best dairy strains, in order to guard against degeneration of the stock. The axiom that "the bull is half the herd" deserves special attention. For that purpose, the matter of placing some good stud bulls at convenient centres, and either selling them at cost price and on excellent terms, or renting them to farmers, is now under consideration.

Milking machines are offered to owners of dairy-herds by the Department also on two years' terms, and at cost price. The labour problem in regard to dairying is one which is of particular importance, and in this respect the milking machine has of recent years helped to remove one of the chief obstacles to dairying in a country where labour is costly, and sometimes ill-adapted for the exigencies of that class of work.

One Milking Machine has already been introduced, and is at work on a dairy farm in the vicinity of Perth. Another one is on order for the Brunswick Dairy Farm, and negotiations are proceeding for the purchase of several others.

Another question which has an important bearing on the question of successful dairying refers to the feeding of cows. In every country there is a season when Nature provides an abundance of feed, and another season of vegetative rest, when stock have to be artificially fed.

This is particularly noticeable in some of the colder countries, where winters are extremely severe. With us the conditions are reversed, and towards the end of our dry summer, grasses are often of little value, or at times are consumed by fires. The method of conserving fodder in a succulent form by the process of ensilage, which has found favour in other places, under different conditions, is one which, in the drier portions of Western Australia, deserves more than passing attention.

In order to encourage the wider use of silos, farmers and stock owners have been invited to apply to the Department, and arrange for the construction of suitable silos, which will be paid for also on long terms. Little response has as yet been given to this invitation, but meanwhile, large wooden circular silos have been erected on some of the State Farms, and the result of the feeding of stock by means of fodder crops thus secured when at their most nutritious stage, will be made public.

With the object of further encouraging dairying farming and supplying the cows with an abundance of green fodder, the Department is prepared to negotiate with farmers desirous of taking advantage of Irrigation as a means of growing fodder crops. It is intended to provide in this respect an object lesson at the Brunswick State Farm, when it is expected that others will follow the lead offered, wherever the conditions are favourable.

Breeding Ewes.

The sustained agricultural development which has set in of recent years, coupled with the rise in the price of wool, and the satisfactory returns which have attended the first shipments of frozen fat lambs from Western Australia, have created a brisk demand for sheep of all kinds. The number of sheep in the State in 1906 was 2,248,976, 1905, 3,120,703.

Since then, farther marked increase has taken place.

With a view of helping settlers to secure young breeding ewes of a class suitable for the country they are on, the Government, through the agency of the Agricultural Bank, is already advancing up to £100 to applicants offering the required guarantee. The Agricultural Department, untrammelled by the regulations which must govern the operations of such an institution as the Agricultural Bank has, within the past few months, called for applications for young Merino or cross-bred ewes. Applicants must give for the stock a lien on their property, or offer such substantial guarantee that lends security to the transaction. They must, besides, satisfy the Department that their land is fenced, that the sheep cannot have access to any injurious bush plants, and that the paddocks are supplied with both feed and water. After these conditions have been complied with, the application is submitted to the Hon. the Minister for approval, when steps are taken to introduce the sheep. A limit of £300 worth of sheep has been decided upon, and as it is the object of the Government to add to the flocks of the country, it is obvious that applications for the purchase of local sheep are not entertained. The protracted drought which for the past few months has afflicted the Eastern States, more particularly Victoria and New South Wales, has made it possible to buy flocks of ewes of good quality and of the type required, at reduced prices. Difficulties, however, connected with the shipping arrangements have since arisen in consequence of the Coal Miners' Strike at Newcastle. Negotiations have since been renewed, and it is hoped to expedite the shipment of the ewes applied for and effect their delivery with as little delay as possible. The question of feeding sheep by means of farm-grown crops if not so important as in the case of cows, is one which, during the early part of the year, has occupied the attention of the man on the land. The low price then ruling for chaff made it desirable in many cases to convert that commodity into wool and mutton rather than cart, may be, a long distance to the railway station, and pay freight and other charges inherent to marketing. In other cases some farmers find it advantageous at times to give a supplementary ration of chaff to their ewes after lambing, especially if food is short, or when a bush fire has consumed the grass reserve. In other instances it is found desirable to more liberally feed stock.

In order to meet these contingencies, models of self-feeding bins, either on skids or on low wheels, have been constructed and exhibited at Shows. Illustrations of these Self-Feeders have likewise been published and models will, during the summer, be placed at convenient places in the country, so that those desirous of constructing themselves these Self-Feeders may do so after viewing these models, which are simple in construction, and answer satisfactorily the purpose for which they are constructed.

Wine.

The local wine industry cannot be said to be in a healthy condition. Federation has been particularly hard on this industry, mainly on account of the neglect in insisting, at the proper time, to provide protective measures for an industry in which is invested a capital of nearly £250,000. In spite of the slight reduction in the acreage under grape vines, the yield of wine is increasing, as shown by the following table:—

1897	75,693	gallons.
1898	89,099	„
1899	113,799	„
1900	86,801	„
1901	130,377	„
1902	185,735	„
1903	158,853	„
1904	138,371	„
1905	185,070	„
1906	208,911	„

This increase, however, has now reached its highest point, and until measures are taken to safeguard the local industry, its expansion must cease.

The wine industry is one particularly adapted to the conditions offered both by climate and soil in Western Australia. It is not, however, progressing as it should, and must continue to vegetate in a state of stagnation until the legislature extend to it a tardy justice. An amendment of the Licensing Act would, it is expected, affect much good by permitting it to compete against wines made in other parts of the world. The matter is now occupying the minds of wine growers, whose united representations on this matter which vitally affects their industry, must carry the weight it can reasonably expect.

The keener competition of more recent years has done much in stimulating growers to exercise a greater amount of care and attention in the growth, the manufacture, and in the rearing of their wines. As a result, the present day produce of Western Australian cellars presents a considerable improvement when compared with the wine made some years ago.

The revision of the Federal Tariff as regards duty on spirits may encourage larger production by offering more liberal concession in favour of Australian distilled spirits, and the discussion of that measure is awaited with much interest.

Surra in Camels.

During the year a good deal of concern and anxiety has been created, more especially amongst stock owners, by the fact that a few Indian camels out of a consignment of 500 introduced from Kurrachee were found to harbour a particular micro-organism lately discovered to be associated with Surra.

The introduction of these camels were strongly recommended for the purpose of cheapening the cost of carrying goods from Port Hedland to the new Goldfields of Marble Bar in the North-West of Western Australia.

The Government of the day was induced by their advisers to agree to this proposal, and special permission was accordingly granted by means of of an amendment of the Stock Regulations.

The camels are pronounced by those who have seen them to be in excellent condition. They were accompanied by a clean certificate of health from the veterinary authorities at Kurrachee, and came from a part of India where Surra has not been in evidence for the past fiftten years. They were, however, on arrival, subject to a very close inspection. A further measure of precaution, for the first time adopted in Australia, of making a microscopical examination of blood smears, taken on glass slides, from each individual camel, revealed in the case of three of the animals the presence of a few trypanosomes.

The Government Pathologist, Dr. Cleland, was thereupon commissioned to further investigate, and proceeded to the quarantine locality, remaining there several months making a thorough examination of the herd.

As a result of this examination, seven camels showing the suspicious germs were destroyed. The animals were, to all appearance, in good health, but their temperature, unlike that of others, showed recurring attacks of fever. During these periods germs were detected in the blood, resembling the *Trypanosoma Evansi*, causing a disease known in India as "Surra." Inoculations from the infected animals into horses, dogs, rats, and guinea pigs have, in several instances, reproduced the fever in these animals with the appearance in their blood of the same parasites. For obvious reasons the horses were destroyed as soon as the fact of transmission of the disease was established. It was possible, however, for the Government Pathologist to keep some of the dogs, rats, and guinea pigs under control without danger, so as to enable the disease to run its somewhat lengthy course. At the end of November one of the first dogs inoculated some months before and one of the guinea pigs were reported to have succumbed to the disease. Some of the others died of exposure to the sun while moving camp. From the experience now gained, it is safe to infer that the fact that the disease has not hitherto manifested itself amongst camels and other animals introduced into South Australia, and into the sister States, is due to the absence of the particular blood-sucking fly which in India and South Africa transmits the disease by means of direct inoculation.

Owing to this fact the disease, one can reasonably infer, gradually died out in affected animals and no harm resulted.

The action taken by this Government has averted what might have been a national calamity, and has also demonstrated how important it is to more thoroughly test on arrival, than has in the past been done, animals introduced from other countries where obscure stock diseases occur. The camels are still in quarantine, and will only be released when it is established without a doubt that they are free from any infectious disease.

I have, etc.,

A. DESPEISSIS, M.R.A.C.,

1st December, 1907. Under Secretary for Agriculture.

Return of Cases of Fruit imported into Western Australia, 1906-7.

	Apples.	Pears.	Quinces.	Apricots.	Peaches.	Plums.	Cherries.	Loquats.	Oranges.	Lemons.	Pomeloes.	Bananas.	Pine Apples.	Passion Fruit.	Gooseberries.	All other Fruits.	Grand Total.
Totals, 1906-7 ...	20,369½	60	...	82	8	1,353	2,871	334	14,157	7,002	23	14,066½	564	911½	609	14	62,424½
Totals, 1905-6 ...	43,809½	543	...	54	...	1,357	4,561	394	21,541½	8,543½	69	17,472½	358	768	1,158	100	100,729
Increase... ...	...	...	...	28	8	...	...	...	...	...	...	...	206	143½	...	...	...
Decrease ...	23,440	483	...	...	...	4	1,690	60	7,384½	1,541½	46	3,406	...	...	549	86	38,304½

Return of Fruit Trees and Ornamental Plants into Western Australia—1906-7.

	Apple.	Almond.	Apricot.	Cherry.	Fig.	Lemon.	Loquat.	Mulberry.	Nectarine.	Orange.	Peach.	Pear.	Persimmon.	Plum.	Quince.	Small Fruits.	Ornamental.	All Others.
Totals 1906-7 ...	86,356	1,865	16.788	2,935	947	1,644	1,010	1,258	3,986	33,311	15,137	13,200	...	10,599	664	2,343	72,434	43,749
Totals 1905-6 ...	73,894	1·078	7,625	4,882	1,274	1,978	1,037	1,085	2,940	38.125	18,746	10,963	106	11,788	1,079	7,073	78,759	74,555
Increase	12.462	787	9,163	..	..	...	...	173	1,046	..	...	2,237	...	...	...	...	...	...
Decrease	...	...	...	1,947	327	334	27	...	...	4,814	3,609	...	106	1,189	415	4,730	6,325	30,806

Totals for 1906-7 308,226
Totals for 1905-6 337,987

Increases for 1906-7 25,868
Decreases for 1906-7 54,629

Decrease for year 1906-7 28,761

ANNUAL REPORTS OF THE MANAGER, GOVERNMENT REFRIGERATING WORKS, ON THE COLD STORES, MARKETS, AND ABATTOIRS.

The Under Secretary for Agriculture.

Herewith the tenth Annual Report of the Manager of the Government Cool Stores, the Second Annual Report of the Government Abattoirs, and the Annual Report of the Perth City Markets.

Cold Stores.

The year's results, though hardly up to expectations, have been highly satisfactory from the developmental standpoint. We have had fresh fruit of one kind or another in the Store the whole of the year, and the interest taken in our work by growers and handlers generally points to a rapidly widening interest.

We have, by countless interviews and scores of letters, endeavoured to inculcate into them that first-class stuff of any sort (barely ripe), packed and handled in the manner they would eggs, is bound to pay.

We have also, incidentally, demonstrated that the cold storage man can test the keeping and export possibilities and qualities of the grower's stuff—if he be buying or selling an orchard—more effectively and conclusively than any other known means of fresh fruit handling.

In a fruit-growing country like Western Australia, we believe the cold storage test of fruit is second to none, and investors seriously contemplating the purchase of orchards, with young or old trees, will be well paid by testing soil or locality defects by this method. As cold storage of fruit is only beginning, a good deal of heart-burning must be experienced by growers in finding that their fruit is not quite all they believe it to be. The endurance test is a stiff one, and the grower whose stuff comes out clean, round, and heavy has a payable business in hand.

The development of scald, bitter pit, internal mould, etc., is disheartening enough, but losses from causes that are preventible are mostly the heaviest losses, and our task to listen patiently to wild talk and take a share of blame that was obviously traceable to soil defects, or ignorance in handling by grower or carrier, is one of the things that the cold storage man accepts with resignation in his altruistic existence.

The year beginning with an extensive renovation of plant and building kept us busy all the first half in holding the business together while alterations and repairs were in progress. Our clients were retained during the whole of the time, but, of course, with so many men and lights, together with the accompanying door opening, breaching of the walls, etc., to get out the old gear and the new in, made the cooling expenditure something higher than normal.

Our recommendation as to the machinery equipment was approved of, and the work was executed by the Public Works Department, who co-operated with us in the building and plant alterations in keeping the business going during this period, with the result that no complaints were made by clients during the whole of the time. Considering that the machine could not be spared off work for more than twelve hours at a time, and that the principal parts of our plant were removed and replaced by new ones, and that the new linings were put on inside the whole of the cool storage walls, we have no hesitation in saying the scheme was most creditably and economically carried out by the Public Works Department. The old plant of high class British make was considered good enough to carry another set of parts on the refrigerating end, and a pair of compressors, an open air condenser, a forced air cooler, and ice tank were installed by the Linde Australian Company. The works are now equipped with the brine-walls system as originally supplied by Hall's, Dartford, together with the forced air system of Linde.

With this combination the best features of the old system are retained so far as this gear was worth repairing and putting back. The acquisition of the latter date Linde apparatus, to augment the Hall system of brine-walls and still air, is probably the very best that could have been done in the circumstances. Had the buildings been demolished and an all round new building and plant installed, the continuity of our experimental and Royal Show work would have to have been abandoned. This would have been as calamitous to the Department as to the State, for the results achieved by the sale of fruit at the unprecedented price of 28s. per case for apples 6 months old, at public auction, and no lack of such cold storage facts and fruit at the Industrial Exhibition of December last, where samples were distributed daily, marks an epoch in the fruit business of the State.

These few dozen cases of Mt. Barker apples, coming out of our store in the hot weather of December, were sampled, and pronounced splendid by all sorts of judges. Expressions of surprise and gratification reached us from the House of Parliament, the Chamber of Commerce, right up to the deputation of State School boys, who came to Perth from Bridgetown to see the Industrial Exhibition in December last.

As no other entries in our Departments were received at the last Agricultural Show at Claremont for cold storage fruit, we may reasonably claim the honour of opening the eyes of the public to what cold storage could do for the fruit industry.

There was a falling off in ice revenue through the drop in price of 50 per cent. This was brought about by a new co-operative concern taking up the ice and cold storage business. The inducement held out in the prospectus, that ice would be made at a few shillings per ton, was looked upon by consumers as a millenial state of things, and would bring about a much desired boon for hot weather. If it had been carried out it would have been so, but the venture, however, was not a financial success selling at seven times the figure mentioned. The short-lived company had the satisfaction of spoiling what was, previously, a barely paying branch of the cold storage business. If any margin of profit remains in this business for the four summer months, it is more than offset by the hitherto poor business of the rest of the year.

The shareholders probably paid more for their ice than ever, after the calls are settled up, and are now experienced enough to speak with some authority on the ice business.

The total quantity of cold storage fruit stored this year in Western Australia will probably exceed 14,000 cases, and at this rate of increase, new stores will have to be erected, before another season, to cope with the crop. We had our space all filled up before the end of April and had to shut out possible clients.

Our cold storage contemporaries also report solid progress, and they, like ourselves, are doing this work for practically what it costs.

The prices obtained for storage in Victoria, where coal and labour are cheaper and climatic conditions favour the minimum of expenditure for a given result, have not been made any higher here this season, but it would require a proportionately larger volume of business to make the thing pay as well in Western Australia. We gave a special rate of 1d. per case per week, with a limit of 10 cases for growers, in order to practically make the benefit of cool storage evident to all. Forty-six have responded and expressed their satisfaction at the results, and promised better stuff and larger quantities next year.

As instructed by you in February last, we are storing free all fruit entries for the next Royal Show. Response is good, and this show will not be solely dependent upon a few varieties, as was the case last year from one district, but will probably have a display with a range of varieties, wide and as broad as our fruit acreage, which will demonstrate to the thousands who visit our annual exhibition that high-grade fruit is worth storing and will always command its price.

Fruit Destruction.

The destruction of condemned fruit this year was a heavy burden on our facilities for such work. Owing to the inability of the City Council to deal with our condemned stuff at the rubbish destructor, from the beginning of February onwards, our steam boilers were used for the purpose of burning all rejected stuff. The quantity, some days, was far beyond our capacity, and the nuisance of the congestion of such stuff can be readily imagined. After destroying about 1,200 cases of all sorts we are satisfied that some better arrangement will have to be made for next season.

Besides the coal and labour chargeable to this work there is also the corresponding cleaning of the boiler tubes and flues, which become coated with the products of combustion, all of which tend to reduce the steaming power of a boiler and impede our routine work. A small fruit incinerator will have to be provided for this special work, as the probability of the quantity of fly-punctured stuff diminishing is remote.

Cold Storage of Fly-punctured Fruit.

We cool stored a few hundred cases of stuff not too badly infested, and the results point to considerable saving for the grower. Broadly speaking, apples that might be condemned, or at most bring 1s. 6d. to 2s. per case, can always bring 5s. to 8s. after cool treatment. This treatment, though in no way dealing with the root of the matter, is a palliative that cannot be despised. The prevalence of the pest has brought out quite a number of ingenious inventions for the orchard, and as the best brains of Australia are at present working on preventive means, it might be just as well to keep in view that the quota of eggs and maggots killed here takes place after the damage is done. We have now satisfied ourselves that at least 59 per cent. of all eggs and worms are destroyed by a temperature of 30 to 32 degrees F. applied continuously for 20 days, but so far as preventing the propagation of the pest is concerned, fire is the only cure. If the whole of our fruit crop was passed through cold storage as a preventive before it was marketed, larger buildings would have to be erected and especially designed for this work.

On the present season's showing, such a scheme would be a very great advantage to the grower, as the percentage of absolutely pest-free fruit is diminishing, while the infected area is increasing. Growers are often unaware, or profess to be, of the extent of its ravages. The rapid development in February and March is a serious matter to a grower who sends his stuff "just a few punctured," and after a hot night in a railway van or goods shed, finds that the stuff has been condemned at the market and destroyed. The cold storage man's share of this work should be the treatment of every case sent to market from the infected areas. Every case should have a certificate that a minimum period of cold treatment, say one week, has been received by the fruit before it passes the Inspector. It would be futile for us to have compulsory treatment, say, in Perth, while the Kalgoorlie markets are left open. If a fruit shed is necessary at Fremantle for all oversea stuff, the time is not far distant when we must be as thorough, though not necessarily as drastic, in destruction at every principal town in the State if system is to be the weapon to fight any such take-all as the fruit fly.

COLD STORAGE FRUIT NOTES, 1907.

Stone Fruit.

One case of large apricots from Mr. Dunn's orchard on the Porongorups arrived on 16th January. They were fully developed and rather prime for long storage. After grading out about 20 per cent. that were bruised, we held them until the 20th February before any noticeable change took place. On 7th February and 11th March we sent samples to your office and the Hon. Minister's, by which time a toughness, and what might aptly be termed a carrot-like flavour and texture, was noticeable, but up to that point they were of commercial value.

Following their behaviour against a temperature of 32-34 degrees F., and 1½ to 2 degrees difference between the wet and dry bulbs of the thermometer for the following six weeks, it was observed that gradual shrinkage and rot developed from wherever the slightest bruise or skin abrasion had been caused by handling or rubbing. We kept them in an open wooden tray, with no padding or paper, one layer deep and freely exposed to the average varying humidities of an ordinary cold storage chamber cooled by brine walls and forced air at will. We have no doubt that apricots, just hard enough to support their own weight without bruising, will be in condition to stand handling, transport, and storage on practical lines, provided the fruits are wrapped either individually or in each compartment of one layer trays, and the direct action of the cold air is kept from their surface.

Very choice peaches from Mr. E. B. Stephens, Wooroloo, arrived 13th February in two trays ; this was a very fine, large-sized (averaging 5½ to 6 dozen per half case), full-flavoured sample. The first overhaul resulted in grading out some of the ripest, which, as usual, had suffered in transit, though wrapped in paper. In all, 6 dozen remained after the first grading, and samples periodically forwarded to you showed the progress of desiccation and decay. We tested this sample right out, and our conviction is that quality is not of as much importance as condition to the cold storage man at the time of storing. Some of them were eatable at the beginning of May, and the sample sent to Head Office on that date were presentable so far as form went, but the flavour had become flat.

Lady Palmerston peaches from Mr. Williams, Bridgetown, are still in the store. Their form and colour is not unsightly, but the usual discolouration where they have been bruised, is very noticeable ; in fact the gradual darkening of the peaches' flesh seems to begin very shortly after cooling down, if they are at all soft. Some will cut dark at the end of a fortnight, while others somewhat harder will show no darkening ; the natural inference being that the shocks caused by the lifting or dropping of the cases is more destructive to the cell life in the softer stages of advancing maturity than in the firmer state of development. Peaches deteriorate and die in cold storage ; some at the end of the first month, others not until three months have elapsed. A month may be looked upon as the average term for good results.

Japanese plums held here from a green stage took six weeks to ripen to the rich tints of the fully-developed condition. The pear-shaped variety (Kelsey) has many of the cold storage essentials when picked hard. There should be no trouble experienced with consignments of this fruit to the other side of the globe in a temperature of 40 to 36 degrees F., or even lower, with a difference of 1½ to 2 degrees between the wet and dry thermometer. Storage affects the flesh of this particular plum but very little, the juiciness is retained in a striking manner together with the colour right up to the point of full ripeness, and so far as we are capable of judging do not die like peaches. A sample kept from the beginning of March to the end of June in the cool chamber can have all its decay easily credited to the effect of handling and skin abrasion, as the parts free from these injuries are quite juicy and well flavoured, though, of course, long past saleableness.

The nectarines that we handled we found to stand well. The fruit, though very cheap at the glut period, does not have a long season. Prices realised this year, according to market reports, go to show that cold storage has great possibilities for this variety of fruit. It can stand a temperature of 28 degrees F. for weeks (provided, of course, they are not too soft and ripe), and keep their condition in a remarkable manner for months. Nectarines grown in Western Australia can stand more cold storage than is credited by cold storage authorities. The two greatest needs for cold storage to be met are—first, a rigid case, and second, the adoption of some light, soft, cheap, flavourless, odourless, incombustible, sterile packing, to prevent mechanical bruising between fruit or between fruit and case.

Cork dust makes a peach taste like a cork after three weeks storage contact. Grapes packed in oat straw exchange the flavour of the straw in about the same time. It may pay to have a cheap packing such as dry sand, or, as easily obtainable, flour mill offals, to convey the fruit from the orchard to the store.

The flavour exchange must never be lost sight of, but anything must surely be worth considering that will reduce the rough handling loss. Wood-wool, shredded bark, shredded straw, sawdust, dry sand, dry sea-weed, or dry moss might suggest something to the grower before he consigns his delicate stone fruit to the tender handling of the railway or carrier. Something to offset the tax on our fruit by the fly will have to be considered to reduce preventable losses. Losses that reduce the prices in the auction room a few days after plucking might mount up over all profitable returns when the cold storage man has to deal with such stuff for as many months. The fruit fly maggot, of which so much has been written, makes awful havoc on peach and nectarine as soon as they begin to soften into maturity. Stuff that we experimented with for the department in testing the utility of cold for the mitigation of the grower's loss, go to show that of two evils, a ripe peach spoiled by maggots and maggot cavities, or a hard peach with only a few punctures and no cavities, the grower has the best chance with the latter. The former is simply spoiled by the waste matter in the cavity, to say nothing of the repulsive look of an opened section containing the pest at work or pupating. Taken in time, we arrest the further development of the egg, which is all that can be expected from temperature control. This saves the bulk of the fruit and destroys the bulk of the eggs. It might be safely assumed that the percentage of eggs left for further mischief at the end of a month's chilling is exceedingly small, probably *nil.* But to assert that thorough destruction follows a short stay in the chilling room is contrary to our experience and observation of the last three seasons, in which we have cut open thousands of samples of all kinds of fruit at every conceivable point of development.

Apples.

We have handled most of the varieties the State produces, and the general rule, that condition is of more importance than kind, holds good all the way.

A good, heavy, fairly hard sample that will not develop scald, black spot, or bitter pit is, roughly speaking, all that the cold storage man wants.

The need of a packing and grading centre is painfully evident, when stuff that has been in store for twelve weeks, say, is opened. Growers, either in ignorance or over-caution, not only pack in fruit of all sizes, but stuff of different stages of ripeness, which goes a long way to defeat the end of our work. An average size, of average colour and weight, should be in the packer's mind before he starts wrapping.

Another shortcoming of growers is to hold their stuff a few weeks before sending it along ; mealiness is the result. The varieties, Nick-a-jack, Rome Beauty, and Northern Spy will not succeed in the long run, if this is to be prevented by cool storing.. However, with its delicate aroma, Cleopatra, and the delectable Granny Smith must reach us in full juice to be a success.

The more rugged Dunn's Seedling, Five Crowns, or Rokewoods do not appear to feel storage for a time, but the lack of weight at the end of a long run is of great importance, and no cellar or barn storage yet made can turn out anything like the weight that properly controlled temperature and humidity can.

Losses on well handled stuff of average size and condition need not exceed 1 per cent. per month while in the cold store, provided that a good paper wrapper is used on each fruit, and the packages not too big. The crushing strains on a column of fruit varies with the kind, and a case stored on its side has the minimum of weight on the bottom row, while a pile of fruit in a barn or cellar may have a pressure of perhaps four times as much on the bottom row when coverings are heavy.

The more advanced growers and orchard companies certainly have experienced men as graders and packers fit to put stuff on any market, but, on the other hand, uniformity of grade and condition can only be attained by one common system and practice.

Pears.

We handled about 500 cases of various varieties ; the Williams or Bartlett predominating. We have a few cases of this sort still on hand, and the remarks we made on the stone fruit—that condition is of more importance than kind and quality—holds good in regard to pears.

Some pears, so delicately flavoured and juicy, have peculiarities of their own, and this summer's crop of pears was really the first bulk sample under cold storage conditions in Western Australia.

The cold storage man's position in the transference of the fruit from the grower to the consumer is of first importance, and too much responsibility for all he can make on this very perishable commodity. Growers usually are of opinion that their particular lot is second to none. Agents declare the value of certain stuff, when it is stored, higher than current market quotations. Should the stuff ripen before the promised rise in prices comes off, the cold storage man is cursed by bell, book, and candle, for spoiling stuff of whose history he has only a partial knowledge and in whose life history he has only a small share ; after the heated, unventilated railway trucks, goods sheds, or commission agents' stores have done their best in the humid period of the pear harvest.

Claims may be made, for instance, against the Department, because our certified thermometers do not show a reading as low as, say, that of a contemporary, and the stuff ripens. Our contemporary's stuff may not even then turn out as well as he would like it in price, the result is that for the mere nominal sum that storage returns on fruit, cold stores are saddled with more than the current value of the stuff for the time being, while they may not be netting one-tenth of one per cent. for its value for keeping it. This would be a very profitable business in the perishable trade if a client simply sat back and let his stuff ripen and rot before attempting to realise on it after his own eyes are opened to his own share of responsibility. He generally relieves himself by slandering us, and exaggerating his loss to all possible users of the cold store, and thereby frustrates as much trade and business as would cover his loss many times over. A fruit Shylock must have his pound of flesh if he cannot get a cwt. The question of responsibility has been, time and again, before the courts with varying results, and may probably be heard of here, but how much loss and expense clients would save themselves and others, if they kept in touch with their stuff in the cold store.

Two rates, one "owner's risk," and the other for a "store's risk" seem to us to be the only solution of this trouble, for, if we have to carry the responsibility for a very perishable and readily deteriorating commodity like ripe fruit, we must have charges sufficiently high to allow us a slight margin to defend ourselves against imposition or possible slander.

The life of a pear, in the cold store, varies in length as much probably from soil defects as from any other cause.

The ultimate result of "scald" on pear is death of the fruit itself. The brown shadow, gradually creeping from the green side that never saw the sun, is skin death and is, itself, but the harbinger of the complete end of the pear's existence. This defect is no longer doubted and is traced to soil deficiency by pomological authorities.

The deadening of the skin of any fruit finally settles the question of keeping in the cold store. Specimens cut open, just all but covered by the "brown shadow," are difficult to tell from full-flavoured stuff in the pink of condition, but after a couple of weeks the pear looses its sap and gradually becomes tasteless.

Result of Pear Storage for suitabe stuff of first grade.

William or Bartlett Pear will keep and be a commercial success at the end of three months to five months.

Vicar of Wingfield will keep for four months to six months.

Josephine de Malines often deteriorates rapidly after two months storage. Good stuff should keep twice this period.

Buerré de Capi aumont stored in March were taken out in June fully ripe, and of excellent flavour and juiciness. Pear scald had commenced in a small proportion of them.

Bergamotte keeps very well but shows signs of shrinkage and toughening after three months.

Seckle keeps well when stored hard. A good grade of this stuff should stand for six months.

Fertility, stored in March, taken out in June, stood well, and were a very regular size, showed signs of scald at the end of eight weeks.

Keiffer's Hybrid.—The large variety do not stand so well as the medium. Very deceptive in appearance as yellowness often mistaken for full maturity.

ABATTOIRS.

The second year's work on the Abattoirs included visits to Kalgoorlie in October and May to settle the site question. The Hon. the Minister, in visiting all the existing slaughter yards with the local inspector, saw things as they are. The sewerage problem and road and rail transport were all thrashed out on the ground with the local authorities and those interested, and the long disputed question was settled to the entire satisfaction of all concerned on the 17th May. Levels have since been recorded, and plans for this work are now in detail. It was deemed expedient to proceed first with the slaughter and meat hanging halls, with the necessary digesters and fertiliser machinery to work up the bye products, and leave the question of the railway siding and the cold storage over for the present. This will be workable all the cool weather at least, but doubtless will eventually solve itself in favour of what is known as the best practice even in Europe. Whether stock cost more to cool store than what they loose in condition or food value is now no longer a matter of uncertainty, but the exigencies of the case must be an accepted explanation as the best arrangement for the present.

The North Fremantle scheme for export depôt, sale yards, abattoirs, and cold storage was also prepared and reported upon. The Hon. the Minister visited this site several times and went deeply into every detail of convenience and capacity. This site and the facilities for shipping and ralway transport will ultimately be the handiest place for collecting or distributing products on the Australian seaboard. The Robb's Jetty abattoirs and stock yards were twice visited during the year, and the existing state of stock handling observed.

The present system has many points favoured by the present locality, and the proposed site will need have mechanical means to comply with health requirements of the very best type in dealing with the undesirable features of a community's meat supply. The refuse, now turned into valuable fertilisers, very soon pays for the expensive plant required. Further use for this plant may be looked to in sterilising all doubtful animal fertilisers that are likely to bring infection to stock. The dreaded anthrax was time and again traced to this source in New Zealand, and a guarantee that all such fertilisers have been subjected to a very high temperature is now being insisted upon before they are allowed to land.

The proposed Works at Wyndham and Cold Storage Depôt in the Southern portion of the State was also discused with the Hon. the Minister and reported upon at various times from various standpoints. It is hard to say which is of greatest importance, the necessity of stock treatment for export, or the claims of the fruit grower. While the stock owner is menaced with tick and the annual wastage through death to reduce his possible returns from his flocks, the fruit grower is handicapped for want of a grading and export centre. The fruit growers as a body have a long way to go for information, and sometimes the source of such information is not too reliable. Agents and shippers can never take the place of a departmentally controlled report depôt. Every case and cases coming over the railways should be overhauled at the port of shipment or distribution.

Perth City Markets.

The Markets were taken over by the Department in December last, and we have dealt with a good many tenants during the remainder of the year. An increase of rental to renovated stalls did not yield all the success it promised. The Hon. the Minister approved of several reductions to stallholders in the retail section. The whole section for meat has been well taken up, and the fish section has also improved. The question of supervising and inspecting all the metropolitan fish supply from this market has been considered by the City Council, and matters now in negotiation may ultimately put the fish business on a better footing. The writer tendered evidence at the Select Committee's inquiry into the fish industry in February, and received the thanks of the Committee for his quota of information.

The full capacity of this market has not, of late years, been availed of by the traders in Perth, but the future promises better. The meat and fish distribution from this centre will be under closer supervision by the health authorities, once the centralisation takes place. Our minute in reference to the fruit shed aspect of the fruit question in February, if adopted, would also bring the doubtful fruit inspection into line by using these markets as the main gateway of the city, for inspection before distribution. If the sanitary supply of milk is taken up here as in other cities there is no reason why the supplies of meat, fruit, fish, and milk could not all go through the one market, at a minimum cost of inspection and a maximum state of soundness for the consumer, which is, after all, what the market and cold stores were built for.

We would like to see a small fruit destructor installed in the upper end of the market, should the scheme of passing all fruit here be adopted. Condemned stuff could then be quickly destroyed after the mark has been made.

After the markets were taken over the caretakers then in charge showed an aversion to lending a hand at the cold stores when a rush was on, as both places were to be run as one. There could be only one alternative, while both men had good records, we were compelled to replace them by another, who, under the new order of things, takes a share of watching the cold storage doors and delivers goods to market clients of both places or the public generally. From April onwards we place one man in charge of both places from midnight to 7 a.m. This saves the wage of a man to the Department. When the refrigerating machinery has to run continuously a temporary watchman will be taken on. Rents are collected by a collector from Head Office, and all back rents are attended to at this end. By the time the fish and fruit requirements are put on a good working footing, no further misgivings about them paying need be entertained.

A. D. CAIRNS,
Manager and Superintendent,
Government Refrigerating Works and Abattoirs.

6th August, 1907.

ANNUAL REPORT OF FIELD OFFICER.

The Under Secretary for Agriculture.

I hereby beg to hand in my annual report for the year ending 30th June, 1907.

My duties as Field Officer keep me fully employed, and necessitae a good deal of travelling about the country, while the position of Inspector of Fertilisers has made a lot of additional work.

During the past year I delivered lantern lectures for the Northam Agricultural Society, Northam Young Men's Association, Bunbury Agricultural Society, Bullsbrook Agricultural Society, and Pingelly Progress Association. The subjects taken were Fertilisers, Grasses, and other agricultural matters. This work could be extended if time permitted, as numerous applications have been made for lectures which I have been unable to give.

The advent of spring with its agricultural shows always makes a very busy time, and I have made it a point of attending as many of these shows as possible. During the year I visited the following shows:—Northam, Pingelly, Guildford, Beverley, Claremont, Katanning, Bunbury, and Narrogin, and acted as judge in the farm section as well as testing milk from the cows entered for dairy competition. At the Royal Agricultural Show at Claremont last year I again took charge of the Department's pavilion, which was filled with exhibits from each of the State Farms as well as exhibits from other branches of the Department. The exhibit made from the State Farm, Hamel, was a very attractive one, and a good object lesson of what can be produced in that district.

During the year the Fertiliser and Feeding Stuffs Act has been put into force, and all vendors have registered their brands and samples of nearly all fertilisers on the market; these have been taken in the prescribed form and submitted to the Government Analyst. Up to June 30th, 1907, there were 27 firms trading in fertilisers, and the following are the registrations, etc.:—

No. of fertilisers registered	136
No. of samples taken for analysis	130
No. of analyses of samples returned by the Government	130
Analyst	130

Particulars of all analyses made have been published from time to time in the *Journal* of this Department, the unit values of each fertiliser being attached for the purpose of comparison. This information should prove a useful guide to purchasers when purchasing their fertilisers.

The importation of fertilisers to this State for the year is as follows:—

1906.	tons.		£
July	304	value	1,621
August	819	value	4,360
September	258	value	1,560
October	300	value	1,617
November	360	value	1,947
December	814	value	3,900
1907.	tons.		£
January	1,124	value	4,458
February	7,179	value	16,809
March	3,944	value	12,891
April	2,218	value	9,597
May	734	value	3,071
June	496	value	2,452

Total, 18,556 tons valued at £63,783.

The feeding stuffs section has not yet been put into force, owing to the Government Analyst being unable to take up the work of analysis. As soon as additional assistance is provided and the samples can be dealt with, we shall proceed to take samples under this section.

Seed distribution on a small scale took place this year: sample packets of seeds were only sent out to approved applicants.

An attempt to cultivate sugar beet. for the purpose of having tested the percentage of sugar, was carried on among settlers on the Preston River. Although the percentage of sugar was good quality, the experiment was not a success owing to the lack of necessary attention being given to the crops by the settlers. The crop was attacked by grubs.

During December and January I was engaged almost entirely in arranging and looking after the Department's exhibit at the Chamber of Manufactures' Exhibition, held in Perth. We had over 4,000 square feet space (floor) which was utilised for a comprehensive collection of farm exhibits as well as modern machinery likely to prove of great use to agriculturists. The principal amongst these were the flax-making plant, the cotton ginning plant, and the milking machine. These exhibits attracted a lot of attention. The net cost of the milking machine was about £200. It was the first machine of its kind shown in this State, and was purchased on my recommendation after returning from the Melbourne Exhibition last year. At the close of the Exhibition this milking machine, consisting of two pulsators, was erected at Messrs. Gull Bros.' dairy at Bellevue, where it is now at work. It has since been decided to install further plants at various centres. At the conclusion of the Exhibition a number of the exhibits were removed and displayed in the Immigration Office on the Fremantle wharf, the fitting up which with agricultural exhibits was placed in my hands. The exhibits are renewed from time to time to keep the place supplied with an up-to-date collection.

In May last the work of keeping the Agent General supplied with fruit and exhibits was placed in my hands, and since that time I have sent fortnightly consignments of fruit, etc., so as to keep the London Office well supplied Considerable difficulty has been experienced in securing space in the mail steamers for these consignments; as the fruit has to be carried in the ship's storeroom, it is more susceptible to changes than if put in the main hold. Next season I hope better arrangements will be made for the shipment of these exhibits.

In addition to the above I have prepared collections of exhibits of Western Australian produce for display at Liverpool Exhibition, England, and also for the travelling exhibition which is being held in London at the present time.

Very little experimental work has been done, the grass plots at Claremont Show Ground being the only ones carried out by the Department. These plots have proved the African Wonder grass to be the most suitable for the conditions there, viz., dry sand and no water during the summer months. These plots have been visited by a large number of people, and considerable interest taken in the grasses planted therein, and I am sorry that it has been decided to discontinue them. The experimental grass which we planted at the Quarantine Depôt at Subiaco has been given up, and the Depôt handed over for the egg-laying competition.

PERCY G. WICKEN,
Field Officer.

10th July, 1907.

ANNUAL REPORT OF CHIEF ORCHARD INSPECTOR.

The Under Secretary for Agriculture.

I have the honour to submit my annual report for the year ending 30th June, 1907.

The latest returns show 12,517 acres under orchards and 3,525 acres under vines; an increase of 1,491 acres under orchards and a decrease of 16 acres under vines, a total increase of 1,475 acres under fruit over last year. To carry out the orchard work under the Insect Pests Act, I have the assistance of six inspectors in the field and part of the services of a port inspector for the fruit auction rooms and shops.

The Northern or tropical parts of this State, as far as fruit is concerned, remain yet to be proved. The whole of the South-West division of this State has already been proved most suitable for the cultivation of fruits other than tropical. The present crop, when the trees are in full bearing, is heavy and the quality excellent; there is therefore every reason why the fruit industry should be strictly cared for with a view to export in all its branches, viz., dried, tinned, and fresh fruits, and of making it one of the principal industries of this State.

Fruit Fly.

This is by far the worst pest in Western Australia, and this year its ravages have been exceptionally severe. There are, I consider, three causes responsible for this: 1st, an exceptionally long dry summer; 2nd, less inspection, on account of the transfer of one inspector to entomological work, and the time of the remainder being partly occupied with other work; and 3rd, more orchards to be inspected.

The number of cases of fruit seized at auctions and shops, principally on account of being infected with the fruit fly maggot this year, total the large quantity of 1,287 cases; a loss to the growers of this State of about

£400, and this is nothing compared to the loss of fruit destroyed in the orchards of which there is no record.

For the sake of comparison I submit the number of cases seized in previous years as follows:—1903, 280 cases; 1904, 421½ cases; 1905, 500 cases; 1906, 415½ cases; 1907, 1,287 cases.

Owing principally to the use of second-hand cases, the fly has spread to the following districts:—Geraldton, Northampton, Narra Tarra, Harvey, Bunbury, Boyanup, Donnybrook, and York. I have hopes we shall be able to clean the Boyanup and Donnybrook districts of the fly. What is required is more inspection to see that careless growers are compelled to destroy all maggoty fruit.

The knowledge that kerosene will attract and destroy the fruit fly is a discovery of the first importance, and an enormous amount of good has already been achieved by its use in shallow tins placed in the centre of the trees. Also good results have followed the use of a patent poison bait which attracts and poisons the flies. Other liquids such as benzole, naphtha, turpentine, ammoniated tar water, etc., have been tried, but I have found none so satisfactory as kerosene.

In addition to the above, the advent of the parasite is eagerly looked forward to. These means of destruction, coupled with systematic inspection ensuring cleanliness in the orchards, should reduce the percentage of loss through the fruit fly to very small proportions.

Codlin Moth.

Since the first discovery of codlin moth in this State in 1903 the total number of infected gardens up to date has been 12 in Perth and 17 in Albany—total 29. The drastic measures taken to eradicate this pest have had a satisfactory result, as careful inspections during the whole of this summer have failed to reveal the presence of one single codlin moth grub either in Perth or Albany. Albany has therefore been clean now for two seasons in succession.

San José Scale.

By thorough inspection during the winter, followed by careful spraying, this scale has been considerably reduced. Last year the infected trees numbered 5,791, this year they number approximately 4,362, a reduction of 1,429 trees. It is also necessary to take into consideration that the trees remaining infected are most of them only so to a very slight extent. As a proof of this we have the following returns of fruit seized at auctions on account of the San José scale, viz., year 1905, fifty cases; 1906, seventeen cases; 1907, eight cases.

Lime, sulphur, and salt have been found very efficacious in dealing with this scale when thoroughly applied with a first-class pump.

Vacuum oil has been found very good for killing the scale; but unfortunately also injures and kills a good many trees. I therefore do not recommend it. Vacuum aphistine oil is being tried this winter and good results are expected from this spray, as it is hoped it will be much safer to use than vacuum oil.

Lecanium Cymbiforme (a Grape vine scale).

This scale has been confined to the Perth suburban area, with the exception of one case at Sawyer's Valley, and is less in evidence now than ever it was. The case referred to at Sawyer's Valley is being carefully attended to. It is to be hoped we shall confine this scale to the suburban area, and that the parasite introduced from California by Mr. Compere will render it harmless within this boundary.

Apple Mussel Scale (Mytalaspis pomorum).

The number of orchards known to have mussel scale in this State is fifteen. Of these five are returned as clean this year, and most of the remaining ten have only a few trees infected. The total number of infected trees being about 230.

Woolly Aphis.

This insect, if given half a chance, spreads rapidly, and where the lady-birds have been eaten by silver-eyes or otherwise disappeared, the spray pump has had to be resorted to. Experiments are being carried out on trees whose roots are infected with this insect.

Red Mite.

Red mites have also been severe, and some growers, notwithstanding the danger of vacuum oil, have used it on their trees as the best wash for killing this pest.

Beetles.

The bush beetle *Otiorhynchus cribricollis* has done much damage in some orchards. An effective way of stopping their attacks is to tie sheep's skin around the base of the tree with the wool outside; they are then unable to get through the tangle of wool, and many die in the attempt.

Pear Slug.

Last year the pear slug was found late in the season in one orchard, this year it was found in twelve. Every means was taken to try and stamp it out, but it is very doubtful if we shall succeed, and time alone will show, as it is probably in other orchards not yet detected.

Potato Moth.

This moth did much damage last spring, being very plentiful, but where taken in time crops were saved by spraying with Paris Green.

Fungoid Diseases.

The long dry summer, whilst favourable to insect life, had a contrary effect on fungoid diseases, which have been less in evidence this year.

Potato Scab.

This disease caused a lot of damage last year, but was not so bad this. The improvement was no doubt partly due to inspection and more care being taken by growers to plant clean seed.

Pear Scab.

Experiments were carried out by spraying with Little's Fluid Dip a few infected pear trees, with good results. This wash may therefore be added to the list of beneficial sprays for fungoid diseases.

The freedom of this State from the many other pests that infect other countries is evidence of the benefits that accrue from the working of the present Insect Pests Act. Nevertheless, in order to prohibit the use of second-hand fruit cases and to extend its powers and application I would suggest that the present Act should be amended.

T. HOOPER,
Chief Inspector of Orchards.

4th July, 1907.

REPORT OF POULTRY EXPERT.

The Under Secretary for Agriculture.

In accordance with your request, I give herewith my Annual Report for the year ending 30th June, 1907.

During the past 12 months I have been stationed at the Narrogin Farm, engaged chiefly in placing the Poultry Department there on a sound footing, and in this respect I consider I have succeeded. Fully 400 young birds were reared during the past 12 months, and about 50 chickens are now doing well as a commencement for the present season. An effort is to be made to rear 1,000 head during the present season. This number I consider can be easily disposed of at an average price of 10s. each, as there is a very strong demand from all parts of the State for healthy pure-bred poultry guaranteed true to name. The receipts for the past 12 months amount to £200, and I expect to double that amount during the coming 12 months, so that the Poultry Farm can now be considered on a good financial basis, as I estimate it will, during the coming year, show a profit of £200 after paying all expenses (my salary not included). The farm also affords good training to the students, is a useful object lesson to persons seeking knowledge on poultry matters, and is the means of distributing a good class of poultry all over the State. Valuation report shows total value of poultry, buildings, and plant, £684 5s.

Egg-laying Competitions, inaugurated and controlled by this Department, have been important factors in forwarding the poultry industry in many ways, and the two which were recently completed, viz., one at Narrogin and one at Subiaco have been a great success in every respect. They have been the means of forcibly drawing public attention to the profits which can be made out of fowls of good laying strains, and spreading this class of poultry all over the State. They have also proved a financial success, costing the Government very little, if anything at all.

The Dissemination of Information on matters relating to poultry has been taken advantage of whenever time and opportunity would permit, chiefly by attending shows, judging, and displaying models of poultry houses, utensils, appliances, samples of foods, etc., also by lectures illustrated by lantern views; by articles in the Department's *Journal,* and by means of correspondence. But notwithstanding all efforts, egg production is not making the progress it should, and I consider that some additional means should be adopted to push along the industry, and for the third time make the recommendation that—

A Farmers' Poultry Competition be commenced. The chief feature of which would be for the Department to offer say £500 as prize money, divided into 12 prizes ranging from £200 to £1, to be awarded to farmers who made the greatest success of poultry as an adjunct to the ordinary mixed farm (poultry farmers pure and simple being debarred). The competition to run for 12 months, and the prizes awarded according to a scale of points to be drawn up, the chief features to be, viz., for financial results as proved by account sales, quality of poultry, management, and records.

A competition of this description would, I consider, do more to advance the industry than the ordinary egg-laying competition, as it offers special inducement to farmers to pay more attention to poultry raising for market purposes. The prevailing custom is to keep a few fowls for home use only, but a competition such as I recommend would be the means of greatly increasing the number of eggs sold in the North and Goldfields markets ; and until our own local markets are much better supplied the importations will not decrease. I would strongly urge that this matter be put in hand at once. The proper date to commence same would be the first of January, but four months' notice would have to be given, to allow intending competitors time to make preparations.

FRANK H. ROBERTSON,
Poultry Expert.

10th July, 1907.

REPORT OF THE ASSISTANT ENTOMOLOGIST.

To the Under Secretary for Agriculture.

Sir,

I beg to submit my annual report from 1st July, 1906, to 30th June, 1907.

The work of this office during the past season has largely been devoted to the rearing and distributing of beneficial insects, which have and are being introduced into the State by the Entomologist from foreign countries.

The number of insect specimens sent to this office by farmers from various sections for identification has increased considerably, and will no doubt continue to do so, as the settlement of the country progresses. These have mostly been identified, and either parasites or remedies advised. There have also been a lot of correspondence and inquiries to attend to.

During the year 516 applications for parasites have been supplied, out of a total of 531.

The *Black Scale* (*Lecanium oleas*), once a most serious pest of the orchards and gardens of this State, and the scale for which the Entomologist was first commissioned to secure parasites, has now, I am pleased to report, been reduced to a harmless scale in this State by its introduced natural enemies.

This scale at one time caused the Department a great deal of annoyance, as it did not confine its attacks to cultivated plants, but was common on many species of wild plants in the bush of this State. 120 colonies of the parasite were distributed during the year.

Soft Brown Scale (*Lecanium hesperidum*).—During the past year three species of parasites upon this pest have been established. These parasites also attack the grape scale (*Lecanium cymbiform*), and have an extraordinary faculty of attacking the young hibernating larvæ of both these scales. In the tiny larvæ of the scale they will only deposit a single egg, while in the half-grown and adult scales they will deposit as many as twenty-nine eggs. One species of these parasites, *Cocophagus lecani,* is recognised in California as the true parasite of the soft brown scale. There is every reason to believe that by next year these parasites, in conjunction with the two species previously introduced, will have destroyed the power of evil in this State of both the soft brown and grape scales. Twelve hundred of these parasites have already been liberated, and there are also a number reproducing in breeding cases on vine cuttings infested with grape scale. The two species of parasites mentioned in my last year's report have in themselves rid many orchards and gardens of this pest. During the year 125 colonies of these parasites were distributed.

Red Scale (*Aspidiotus aurantii*).—This is beyond question the most serious scale pest of the citrus trees in this State, and also of many other garden plants.

The fact of its having such a wide range of food plants, makes it a very difficult one to deal with by artificial means.

To discover the natural enemies of this scale and successfully establish them in California covers a period of twelve years, part of which time two experts were engaged in the search. It was six years after the parasites were first discovered before they were successfully established in that State, sending after sending of them having been made, but without success, all perishing while in transit for want of proper care. Then the method of shipping was changed, and from giving them in charge of the steamer's officials they were taken over by the Entomologist himself, with the result that four species of internal parasites of this scale have been successfully established in California, and the increase has been so rapid there that in a recent letter to Mr. Compere, the State Horticultural Commissioner instructed him not to look for any more parasites of red scale for that State.

Mr. Compere advises that California is forwarding to this State next spring, scale-infested plants containing the above-mentioned parasites.

This successful introduction shows plainly the advantage of having these delicate insects consigned in charge of a competent officer of the Department, as it was not until Mr. Compere himself took charge of the consignment that any success was achieved. This has also been the experience of this State.

On 8th November, 1905, Mr. Compere arrived here with a colony of 14 living specimens of a small yellow parasite of the red scale from Asia. These, upon arrival, were placed in a breeding cage containing two small orange trees infested with the scale. These, after having been exposed to the parasites, were placed in the open in one of the Perth gardens well infested with red scale.

By March, 1906, the parasites had become well established, and began to do excellent work upon the scales, and in January, 1907, colonies were sent to all sections of the State, and have also spread to many orchards on their own account.

On the 22nd June, 1907, Mr. Compere again returned to this State from Oriental regions, bringing with him several additional species of red scale parasites, which are now in the breeding house. These I will try my utmost to get established in this State.

The Palestine ladybird, introduced from that country, continued to do excellent work on the red scale, and many colonies have been distributed throughout the country.

San José Scale (*Aspidiotus perniciosus*).—This is recognised as the worst scale insect attacking deciduous trees. So far the Entomologist has refrained from introducing its parasites from California, for the reason that the Chief Inspector under the Insect Pests Act has been hopeful of exterminating by artificial means, as it only occurs in a limited number of orchards. In California this pest is held in complete subjection by its parasite (*Aphelinus fucipennis*).

Orange Mealy Bug (*Dactylopius citri*).—This destructive citrus tree pest has become well established in this State, but its power for evil has been arrested by its natural enemy (*Cryptoleamus montrouzieri*). This ladybird has also rid the gardens of other species of mealy bugs. Upon the root species of this pest a parasite has yet to be found.

Cabbage Aphis (*Aphis brassicae*).—The introduction of parasites upon this pest has been very successful in the gardens in and around Perth, where a rotation of cabbage crop is maintained, but where the crop is an irregular one, and every vestige of cabbage is removed, the parasites are destroyed, and should a fresh outbreak occur when planting again a new colony of parasites must be introduced. Recently Mr. Compere has sent us another species of parasite upon this pest from Oriental countries, but it is yet too soon to state if it has become established.

Diamond-backed Cabbage Moth (*Plutella cruciferum*).—This very destructive pest of the cabbage, cauliflower, and turnip has been very much reduced by the introduction of a parasite from the Eastern States about four years ago, and within the last month Mr. Compere has introduced another parasite on this pest, but it is yet too early to say if they have or will become established here.

Potato Moth (*Lita solanella*).—This moth continues to cause a great amount of damage, and up to the present the Entomologist has been unable to discover its parasite. On several occasions material has been placed in breeding cages, but up to the present no signs of any local parasites have been discovered.

Woolly Aphis (*Schizoneura lanigera*).—Upon this apple pest we have as yet no true parasite. The Tasmanian ladybird (*Leis conformis*), kindly sent to us by Mr. A. M. Lea, the Government Entomologist at Hobart, continues to do good work in destroying this pest, but not sufficient to hold it in subjection, and we can only hope that the Entomologist will yet discover its true parasite. Several new species of aphis-feeding ladybirds have become established, and should aid in the subjection of this pest.

Fruit Fly (*Ceratitis capitata*).—This is beyond question the most serious pest of the orchardist in this State at the present time, and is responsible for an enormous amount of destroyed fruit. Its already wide range of food fruits continue to increase.

During the year, Inspector Bailey discovered it attacking the berries of the African Box Thorn, a common hedge plant, and from the berries of same a number of fruit flies were bred out.

I also discovered the fly ovipositing in the ripe berries of the rose, but so far have not bred out any flies or larvæ.

This tends to show what a difficult pest we have to deal with, scarcely a fruit, cultivated or wild, that is immune to its attack.

The discovery made by Mr. Devenish, of Guildford, that pure kerosene, when properly placed in the trees, would attract and kill the adult flies will prove to be a most valuable discovery, as this method, which is both a simple and inexpensive one, and if properly carried out in the early part of the fruit season, may be the means of reducing the amount of damage annually caused by this pest.

Parasites.—Owing to our season being opposite to that of the country where the parasites are to be obtained, it is a very difficult matter for the Entomologist to establish the parasites here. However, this difficulty must be got over. To do this it is intended to establish a breeding station, where the maggots of fruit fly are to be obtained all the year round. We will then be able to land them here at a time when there will be plenty of fruit-fly larvæ available.

General Remarks.

During the year just closed the most noticeable features were the following:—The abnormal swarm of catterpillars, cut worms, and leaf-eating insects, also the great increase of damage caused by the fruit fly and potato moth.

The Couch Grass Scale (*Odonaspis Janeirensis*), attacking the roots of this grass, bids fair to be a very serious pest to the lawns, tennis courts, and sporting ovals, etc. Experiments have been made with chemical manures, tobacco wash, and quassia chips, with only temporary results, the scale gradually overpowering the grass again. Being a root affection makes it a very difficult proposition, also the surrounding grass being affected, it is only a matter of time before the lawn is again attacked.

The *Staphylinidae Beetles* liberated in the various orchards have so far not been seen, but it does not follow that they have failed to establish themselves, but may yet turn up in swarms; several species of ladybirds disappearing in the same manner may now be found in numbers.

The following is a list of parasites supplied during the year:—

Black Scale parasites—colonies supplied	120
Brown Scale parasites—colonies supplied	125
Red Scale parasites—colonies supplied	160
Cabbage Aphis—colonies supplied	29
Cabbage Moth—colonies supplied	11
Palestine Ladybirds—colonies supplied	40
Aphis-feeding Ladybirds—colonies supplied	23
Cryptolamus Ladybirds	8
Total	516

Beneficial Insects introduced during the year, 1st July, 1906, to 30th June, 1907, by the Entomologist.

Name.	From	Date.	Liberated.	No.	Date.
Brown Scale	China	2–10–06	All dead	...	...
Do.	California	4–3–07	do.	...	...
Do.	do.	4–3–07	Various places	1,200	Various
Do.	Colombo	28–5–07	Government Gardens	21	do.
Do.	India	22–6–07	do.	22	do.
Cabbage Aphis	Colombo	28–5–07	West Perth	20	4–6–07
Cabbage Moth	do.	28–5–07	do.	35	Various
Fruit Fly	India	27–9–06	Various	190	do.
Red Scale	Japan	4–3–07	Government Gardens	20	15–3–07
Do.	China	4–3–07	do.	20	15–3–07
Do.	Colombo	23–5–07	do.	50	Various
Do.	do	28–5–07	do.	4	5–6–07
Do.	India	22–6–07	Seven species placed in breeding cage to reproduce and will be liberated later on	...	...
Lecanium Cymbiform	California	4–3–07	Various places	1,100	Various
Syrphus flies	Colombo	28–5–07	West Perth	10	5–6–07
Ladybirds	India	2–10–06	do.	62	4–10–06
Do.	Algeria	4–3–07	do.	8	5–3–07
Do.	do.	4–3–07	do.	52	5–3–07
Do.	Colombo	23–5–07	Government Gardens	25	27–5–07
Do.	do.	23–5–07	All dead		...
Do.	do.	23–5–07	West Perth	20	27–5–07
Do.	do.	22–6–07	Government Gardens	16	24–6–07
Do.	do.	22–6–07	do.	4	24–6–07

During the same period our Entomologist forwarded to California a large number of beneficial insects, which we can obtain from there if necessary.

L. J. NEWMAN,
Officer-in-Charge of Parasites.

29th June, 1907.

ANNUAL REPORT OF THE MANAGER, STATE FARM, HAMEL.

The Under Secretary for Agriculture.

EXPERIMENTAL PLOTS, HAMEL.

Sir,—

I forward my Annual Report on the work, etc., done here.

Season.

The rainfall during the winter and spring months was very heavy. The brook overflowed its bank several times, doing serious damage to the cereal and other plots. The summer was long and very dry, unfavourable to the growth of potatoes, maize, and other summer plants, except on moist low land.

Work.

The general object of all the work carried out here is purely experimental, chiefly for testing new varieties of cereals, tubers, grasses, and fruits.

Seed potatoes (a few selected sorts) will be planted more extensively next spring, to permit of choice seed being sold to planters.

Prison Labour.

During the past year new and more commodious piggeries have been erected. Considerable additional fencing, draining, and other farm work was done by the prisoners.

Visitors.

The farm adjoins Hamel Siding on the South Western Railway, about 70 miles south of Perth, and 40 miles north of Bunbury. The plots are usually at their best from November to Christmas, and March to April. Many agriculturists and others have called to inspect the various plants. Visitors are always welcome.

Plants Supplied.

A large quantity of grass plants have been distributed to farmers, also hops, etc., and seeds of new wheats, maizes, etc.

Flowers.

Applications are frequently received for cut flowers, seeds, bulbs, and ornamental shrubs. Such are not cultivated on the farm, and cannot be supplied.

Information Supplied.

Many queries relating to crops, seeds, mode of culture, etc., have been replied to by post. This work now takes up a considerable time.

Cereals.

The experimental plots were all on new land (Block 10), sown end of May and early in June. For the last few weeks the young plants made nice growth. Heavy rains fell early in spring, followed by heavy floods, which almost destroyed a number of plots, thereby greatly reducing the yields.

Wheat.—52 varieties, including several new ones imported from America. Where undamaged by flood water, fair returns were obtained, rate of above 16 bushels per acre. "Belotourka," a Russian bearded sort, proved to be very heavy and prolific. The following will, I think, prove to be useful introductions :—" Elliott's White Spring," " Allen's Spring," and " Spring Bluestem."

Oats.—10 varieties. All poor and badly damaged by wet weather. Growth short and very patchy. Grain fairly plump and heavy. Taken as a whole, the yields were very light. The best for grain are:—"Long's White Tartar," "Giant Dakota," "Clydesdale."

Barley.—5 varieties ; all very poor. However, this cereal never does very well on this farm. Yields light. The best are :—" Californian Red," and " Beardless."

Rye.—2 varieties grew fairly well, and gave good returns of straw and grain. "Markisoher" is still the leading sort.

Hay Crop.

Sixteen acres new land on blocks 12, 13, 14, sown first week in May. Owing to land being sour and very wet, yields very light. Algerian oats gave the best return.

Field Peas.

Two varieties cultivated, the common "Grey" and white "Chilian." Both are strong growers, excellent soil improvers, and cleansers of weedy land. The vines attained to about 8 feet on old but well-drained land on block 26. Grain fed to pigs. Yield satisfactory ; about 25 bushels per acre.

Maize.

Twelve varieties, including four new introductions from America. Sown on low land during November and December ; drills four feet apart ; plants from 18 to 24 inches along the row, according to sort. All suckers were broken off for stock feeding. By doing so the cobs are larger, and fill out better. Taken as a whole, the season was fairly good for this crop, and the returns are up to those of former years ; averaging about 50 bushels per acre. Dent sorts, the best are : early, "Pride of the North," late "Kansas 4568" ; flint kinds, "Farmer's Friend," and "Ninety Day."

Potatoes.

Summer crop comprised 44 plots of new and old sorts, set from the 12th October to 16th November. Planting was unavoidably delayed several weeks owing to floods.

The Red-skin, second early kinds of the "Rose" type gave the best results. Main crop, and late English white varieties do not mature well during the hot season. Taken as a whole, the yields were satisfactory ; rate of from two to ten tons per acre. Among the best coloured varieties are : "Rural Red," "Roser," "Harmony," "Red River Triumph," white "Sir Walter Raleigh," and "The Factor."

The soil of several plots was treated with sulphate of copper and iron, with the idea of checking germs of fungus disease in the soil. The best results were obtained from sulphate of iron, rate of 56lbs. per acre, mixed in and applied with the fertiliser ; this stimulates and promotes healthy growth.

Bordeaux Mixture.—This solution proved a useful preventative of fungoid disease by soaking the cut sets therein for one hour.

Autumn Crop.—Consisted of 16 large plots, which were planted with English imported seed (whole tubers being used), from 5th January to 18th February. The land being low, retained fair moisture without irrigation. The growth was fair and free of disease. Dug in May ; the tubers were sound and good ; yields fair, from below two to nine and a-half tons per acre. The best white kinds were : "The Factor," "Abundance," "Reading Giant," and "Carman No. 1."

Sweet Potatoes (*Ipomoea babatas*).—This useful summer crop should be more generally grown in this State. Most of the varieties give good results on sandy soil. Seven plots were planted with rooted cuttings in October ; all gave fair returns when dug in June. The best are : "Yellow Spanish," "Red Jersey," and "Big Stem Yellow."

Peanuts (*Arachis hypogaea*).

Four plots were sown with imported seed on the 19th October. The plants made nice spreading growth, and have matured a fair crop (June). The nuts are heavy, and well filled out. This fresh seed should prove to be useful for trial in other parts of the State. Sandy, limestone soil is the best for this plant. The most promising are : "Tanjore," "Barbadoe," and "Mauritius."

Cotton (Gossypium herbaceum).

Fifteen plots were sown on fairly dry, low land from 15th October until 8th December. Owing to cold winds and wet weather which prevailed here in October and early November, most of the young plants died, and seed had to be resown. All the plants were very slow of growth, and did not make fair progress until the middle of December. The bolls did not begin to ripen until the end of April and May. Although a fair percentage of lint has been gathered, the results are poor and not equal to the last year's return. For profitable culture this crop requires a warmer district. No doubt in future years a congenial climate and soil will be available in the Northern parts of this State.

Here the American short staple early sorts give the best results. "Louisiana Prolific," "Shine's Early," "Russell's Big Boll," "Culpepper," and "Peterkin's," are good. The "Caravonica," "Sea Island," and Ceylon "South Island" make fine growth, but the bolls fail to mature early enough to escape the early winter rains.

Hop (Humulus lupulus).

Three varieties are now grown here, the best of these is "Oregon," an American sort, robust grower, and free bearer. Hops large, of good strength and aroma. The past season was a favourable one for this crop, the only serious drawback being the high Eastern, or land winds, which fray the catkins, thereby giving the hops a brown colour. Yield of sun dried hops, rate about 600lbs. per acre.

The two English sorts, "Early Golding" and "Golden Grape," did not do well. Sets of the "Oregon" will be ready for distribution in September. The hop plant requires good soil that remains moist during the summer months.

Insect and other pests were not very troublesome during the past season, except the cut worms, which were plentiful in November, and caused serious damage to maize and other young plants by cutting them off below the surface. Several plots had to be resown.

Miscellaneous Plants.

Several new introductions are now being grown under glass, including several varieties of Cassava, and tubers of Yams and Tanniers obtained from Ceylon. Most of these have grown fairly well, and may later on prove to be useful for cultivation in the Northern portion of this State, where the climate is warm and moist.

Pine Apples.—Several plants of the smooth-leaved variety ripened good fruit in the greenhouse.

Florida Beggar Weed (Desmodium tortuosum).—An erect leguminous annual of shrubby branching habit, growing to 6 feet high ; seeds freely. said to be valuable for soil renovation. Prefers a warm and rather moist land.

Cow Pea (Vigna catjang).—Five varieties grown ; the best of these are "Black and Iron." Useful summer crop, for improving the soil, and also feeding the cattle. Seed should be sown late in the spring, after the soil gets warm. When sowing, apply a good dressing of superphosphate, 4 cwts. per acre, harrowed in.

Velvet Bean (*Dolichos multiflorus*).—Summer annual, used as a soil improver, may be ploughed in or fed to the stock like the cow pea. Sow seeds thinly when the ground is warm. Vines grow about 6 feet to 8 feet long on suitable land.

Soja Bean (*Glycine hispida*).—Thrives well in hot weather. Here the annual reaches the height of three feet. Seeds fairly well. Good for ensilage or green feed. Plants on this plot badly damaged by cut worms.

Tanniers.—Imported two years ago from Georgetown, British Guiana. Strong hard plants were set out in the open ground, end of November, these have made nice healthy growth. Here the hot season is too short for the tubers to mature properly.

Buck Yams.—These died off, after setting out. Useless for culture in this climate.

Bananas.—Five varieties. The best and most reliable bearer here is the ordinary plantain. "Koll Kulla." One of those introduced from Ceylon ripened some fruit of good quality, but the plant does not thrive well in this locality.

Cucumbers.—Two sorts. Growth and yield good. Early White is a useful one for home use ; fruits white, medium size, and superior quality.

Egg Plant, "Round Black."—A distinct new sort from Japan. Growth upright, strong, and very prolific. Fruit round, smooth, and large ; colour deep purple. Good table quality.

Rock Melons.—Only two kinds were grown. These produced good fruit. Seeds saved from the finest.

Water Melons.—Four varieties, including new ones from America. This crop did not do well last season. A large number of fine strong plants dying off suddenly after setting fruit. Yield very light ; for quality the best are "Halbert Honey" and "Seminole."

Pumpkins.—Five varieties. Large plots were sown, yielding heavy crops of sound fruit, used for feeding the pigs. For home use and market, "Table crown" and "Bugle" are good reliable sorts.

Tomatoes.—Small plots of nine new and old kinds were grown. Of these, "King Edward VII.," "Golden Queen," and "Tenderloin" were the most prolific.

Orchard.

Planted in August, 1904, area four acres ; block 7. Four hundred trees, 197 varieties, about 20ft. x 20ft. apart. Trees are all healthy, and have made very good progress during the past season.

Almonds.—Six sorts. All are vigorous, fine healthy trees. "Lewelling" produced a few nice fruits.

Apples.—56 sorts. These are the leading family here, all making nice sturdy growth. Those names below are most robust:—"Kooroochiang," "White Winter Permain," "Sharp's Late Red," "Rhode Island Greening," "Reinette-du-Canada," "Hoover," "John Sharp," "Prince Alfred," "Cleopatra," "Sturmer Pippin," "Golden Reinette." The following fruited : "Rome Beauty," "Prince Bismark."

Apricots.—11 sorts. All doing very well, the strongest are "Newcastle," "Gooley," and "Dardanup Favourite."

Cherries.—4 sorts. Suda fruited nicely ; the others are making good wood.

Chestnuts.—5 sorts. Downton is making the best growth, and will make a fine shade tree.

Figs.—9 sorts. All are doing exceedingly well, several have fruited. For all-round good quality "Adriatic White" leads. The best growers are "Adam," "Brunswick," and "Adriatic White."

Guava.—1 sort. Purple-dwarf shrub ; fruit of good quality, freely produced.

Lemons.—3 sorts. All making good headway and fruiting. So far the "Lisbon Thornless" appears to be the best.

Loquats.—4 sorts. All are making fine growth and setting fruit nicely. "Gigantea" shows the best crop. Soil and climate well adapted for the culture of this useful fruit.

Medlar.—2 sorts. Doing nicely. Fruit set freely, but failed to mature any.

Mulberry.—3 sorts. All fruited well. English "Black" being the best in quality. "Downings Everbearing"' is the most vigorous grower, and makes a fine shade tree.

Nectarines.—6 sorts. All healthy, and have made splendid growth ; well set with flower buds.

Oranges.—12 sorts. Making fair progress. Several have fruited, of these the best are : "Jaffa," "Siletta," "Mediterranean Sweet." Mandarins: "Beauty of Glen Retreat," and the Japanese "Oonshin."

Peaches.—15 sorts. All are healthy. Season's growth very fine and well set with flower buds.

Pears.—24 sorts. This family promises to be very successful here ; the following have made the strongest growth:—"Broome Park," "Keiffer's Hybrid," "Bartlett," "Koonce," "Comte de Chambord," "Bailey's Bergamot," "Mount Vernon," "Howell," "Wilder," "Parrot," fruited.

Persimmons.—8 sorts. These are making nice sturdy growth, set with plenty of fruit buds. "Dai Dai Maru" produced fruit, large and of good quality.

Pomegranate.—1 sort. Healthy, but dwarf and bushy.

Plums and Prunes.—7 sorts. All thriving. "King of the Damsons," "Splendour," and "Golden" are the strongest growers.

Japanese Plums.—10 sorts. All vigorous and making fine strong trees. Several produced fine fruit ; but it was stolen before fully matured.

Quince.—7 sorts. All making strong healthy growth.

Walnut and Peccan Nut.—Rather slow, but fair growth.

Fig Plantation.

Planted June, 1905. Area, 6 acres, viz., one acre in block 7, and 5 acres in block 8. Varieties 14 ; 23ft. x 23ft. apart. Comprising the drying figs introduced from California : "California," "Kassaba," "Purple Bulletin," "Bardazic," and Capri No. 1 and No. 2. The others are table sorts, including a new one, "Dalmatie." All have made fine young wood which will give a fair lot of cuttings for propagation. The Smyrna fig should prove to be a valuable acquisition to the State, where the fine warm climate will be an ideal place for maturing superior fruits of this class.

Young Stock.—Last winter all available Fig cuttings were put in a nursery bed, and a fair number of nice plants are now ready.

Note.—The above experimental orchard was established chiefly with the view of testing the value of new varieties of fruits, to ascertain which are really suitable for profitable culture.

Vine Cuttings.

A part of block 23 has been set aside for use as a quarantine station for striking imported vine cuttings. One lot only (8 varieties) was received during the past season. These are healthy and have made splendid growth.

Shade Trees.

Useful and ornamental, planted near the homestead, around the pig and poultry runs, have made good progress, and will provide nice shade in summer. Several small groups were planted last season on the pasture land on blocks 10 and 11 to provide, later on, shade for the live stock.

Fodder Plants.

The varieties noted below have been successfully grown here on the low lands during the past summer.

Yellow Kaffir Corn (*Sorghum caffiorum*).—This variety is hardy; stands dry weather well ; vigorous branching growth ; height 4 feet ; matures seed early ; heads large and well filled. Grain very good for feeding fowls and other stock. A useful plant well adapted to our climate, and worthy of attention by all farmers who desire summer forage or grain.

Jerusalem Corn.—Habit similar to above, but of slower growth, and much later in ripening the seed. The heads stand upright, are large, and well filled with pure white grain. Useful for green feed.

Dhoura (*Sorghum cornum*).—Height 6 feet ; strong stalks ; wide foliage. Seed white ; ripens very late. Valuable for green feed.

Mazagua.—A giant variety of "Dhoura." Stalks are numerous with heavy foliage ; height 10 feet. Estimated yield of green feed here, at rate of 20 tons per acre. This plant requires good soil and fair moisture. Does not mature seed here.

Note.—The four above-named varieties are non-saccharine, and may be safely fed to stock at any stage of growth.

Japanese Millet (*Panicum crusgalli*).—Summer annual grass of rapid growth. Here the plant attains the height of 4 feet, and seeds freely. Very useful for green feed, which may be cut two or three times.

Pearl Millet (*Penicillaria spicata*).—Here, on the moist low land, this plant grows well, stooling freely, reaching the height of 10 feet, and matures good seed. Good green fodder, if cut when about 2 feet high, before the stems get hard and woody. Under favourable conditions it will yield several cuttings.

Teosinte (*Reana luxurians*).—Valuable fodder plant from Central America, which requires very good soil, combined with plenty of heat and moisture. Given such conditions, the growth is really wonderful. Here, it forms a large tussock of medium-sized stems, to 10 feet high. Stock are very fond of it. In this locality very few seeds mature, very late in the season.

Grasses, Various.

Danthonia, or Wallaby.—This valuable Australian grass lasts very well, but is rather difficult to establish. Seed, which germinates slowly, should be sown on the surface early in autumn, when the first rain sets in. It is a good plan with this and other fluffy seeds, to rub them out in damp bonedust or soil, they may then be scattered more evenly.

Other good grasses worthy of cultivation are : "Paspalum dilatatum," "Rhodes Grass," "African Wonder Grass" and "Phalaris commutata" (lately introduced), a native of the Canary Islands. This I think, will prove to be a valuable one for this State. Plants will be available for distribution next year.

Permanent Pasture.

Sown on blocks 10 and 11 in May and June last year. Over 30 acres were laid down in mixed English grasses, rate 30lb. seed per acre. The new land had been summer fallowed and well tilled with the disc and ordinary harrow. Fertiliser mixture in equal parts of bonedust and superphosphate applied broadcast, rate of 2cwt. per acre. The seed germinated very well, but the winter, followed by a long dry summer, severely tried the young plants. Nearly all the Rye grass, and some others died out-right. Those which have stood best are : "Tall Fescue," "Cocksfoot," "Sheep's Burnet," "Timothy," "Tall Oat Grass," "Chewing's Fescue," and "Kentucky Blue Grass." These are now making nice growth, and the paddocks should be fairly good for grazing next summer.

N.B.—When sowing a mixture of English grasses it is a good plan to include some Italian Rye Grass which, being of quick growth, affords a shelter to those of a less robust growth.

I have, etc.,
G. F. BERTHOUD,
Manager State Farm, Hamel.

13th July, 1907.

ANNUAL REPORT OF THE ACTING CHIEF INSPECTOR OF STOCK.

The Under Secretary for Agriculture.

I have the honour to submit herewith the following report of the Stock Department for the year ending 30th June, 1907.

As ten out of the preceding twelve months of my time have been occupied with the duties connected with the Fremantle branch of this Department, with occasional visits into the country districts to inquire into reported mortality among stock and other matters of an official nature, I have scarcely had the necessary time in my present position as acting Chief Inspector of

Stock, the duties of which I took over on 1st May last, to go into matters concerning this Department, as thoroughly as I would have liked.

East Kimberley.

Reports to hand from this territory say that the present season has been one of the wettest known there. This has been favourable to the development of the tick, which is much in evidence, especially on the coast country, where they have been greatly worrying the cattle. At Ivanhoe, Stud Station, Bandicoot, and up the Ord and Denham Rivers the ticks have been very bad indeed; and although there has been grass in abundance the cattle in many instances are very poor and weak and suffering from what the local inspector calls tick poverty. In places they have gone in largely for burning the grass in hopes of lessening the evil. The horses this year, so Inspector Haly informs me, are infested with tick, a thing not known before in East Kimberley to any extent. Another imported bull from England—a red shorthorn, and a valuable animal—died recently at Argyle Station from tick fever. The loss of this animal (and he is not the only one to go in this manner) is very disheartening to the owners, Messrs. Connor, Doherty, & Durack, as they have spared neither trouble nor expense to improve the breed of cattle in East Kimberley. The introduction of stud Hereford cattle into East Kimberley is a new departure, and is being done with a view of imparting a strain of Hereford blood into the Shorthorn at Lissadale; the proprietors being of opinion that this cross will be hardier and better able to withstand the many hardships cattle are subjected to in that country. The result of this experiment should be interesting.

Pleuro-pneumonia has been found among some of the East Kimberley cattle arriving at Fremantle this season, and the mortality on this account, aggravated no doubt by the driving and excitement consequent on shipment, have been in a few instances rather heavier than usual on the voyage down. These East Kimberley cattle, it must be admitted, are a source of no small trouble and anxiety to everybody who has to do with them on their coming South, and it will be a great good accomplished when the contemplated erection of freezing and canning works are an established fact at the Port of Wyndham, which will enable all cattle in that part of the State being dealt with on the spot, thereby saving both time and expense, not to mention other drawbacks, incurred through having to transport them over so great a distance of land and water as at present.

West Kimberley.

The West Kimberley cattle are reported to be doing well and are certainly remarkably free from disease. The proposed erection of Government Abattoirs at Fremantle is certainly a step in the right direction as every common-sense person will admit, as it will centralise the killing which will then be all under one roof, doing away with the existing isolated premises used for this purpose, which are with a single exception, both old and dilapidated, and thereby making meat inspection, etc., by the officials an easy and convenient process.

Speaking of the local cattle—I mean those bred in the Southern portions of the State, the Murchison and Midlands—they are, I am informed, improving from year to year. These animals are also very free from disease. Cases of tuberculosis are met with occasionally among dairy cows, but animals found to be affected in this way are promptly destroyed whenever discovered, and the trouble is being as far as possible gradually but surely weeded out. Nevertheless I believe that the purity of our milk supply, although there is still room for improvement in many instances in the matter of cleanliness, will compare favourably with that obtained elsewhere. Dairymen are beginning to wake up and to understand that in this age of competition it will not pay to neglect even the smallest detail of their business and, therefore, the more intelligent of those engaged in the pursuit recognise that to be up to date and abreast of the times is but looking after their own interests as well as those of the public.

The idea of the State paying a small compensation for the destruction of animals reported to be suffering from diseases communicable to man or beast is one worthy of consideration.

In the first place, the idea if acted upon would be some encouragement to owners of cattle to report such cases to the Stock Inspector or central authority, and this from a public health point of view by helping to stamp out disease would be of no small consequence.

It might, perhaps, cost the State a paltry couple of hundred pounds per annum, this compensation allowance, but the amount of good it would do would far outweigh any mere monetary expenditure in guarding the health of the people, which after all is the main thing, especially that of the rising generation and more particularly still the very young children whom we know are peculiarly liable to infection from a contaminated milk supply. Without doubt some of our infant mortality from consumption of the bowels is brought about directly through partaking of milk from tubercular cows. It may naturally be asked, then why are these animals not destroyed and the source of the trouble got rid of ? I admit an explanation is called for.

Advanced cases of tuberculosis in cattle may easily be detected and dealt with as the symptoms are obvious enough and seldom escape the notice of the most shortsighted person. It is otherwise with those animals that are affected in a slight degree and show no external symptoms whatever of being so affected. A small tubercular lesion in the udder quite beyond detection by ordinary manipulation may deal death and destruction to those who are unfortunate enough to drink of the unboiled milk from such a source. This is where the danger lurks. I need not go into the question as to whether bovine tuberculosis is transmissible to human beings or not. Suffice it to say, that the highest authorities believe that it is, and therefore it is just as well to take precautions and run no more risks than we can help.

The tuberculin test applied in a systematic manner to all dairy cattle from which the public derive their milk supply would no doubt, if carried out by a competent hand, have the effect of bringing to light many incipient cases of tuberculosis that are now entirely beyond ordinary means of detection. Herein lies the value of the tuberculin test, which although not infallible is now recognised as being very nearly so. I do not think that this test is so difficult to apply as to be beyond the person of average intelligence once it is explained to them. All that is needed is a civilised man who can be depended upon to do the work and take common-sense precautions as regards cleanliness.

Unfortunately the staff of this Department is so small at present and so much occupied with other important duties that to go through the cattle as I suggest is entirely out of the question without further assistance.

The Government, as evidenced in many ways, are doing all in their power in a legitimate way to foster the dairying industry in this State. The importation of a number of Ayrshire and grade dairy cows from the Eastern States, which was recently decided upon as a means of helping things along in a practical manner, will no doubt in a little time have a far-reaching effect for good.

Horses.

In the matter of horses I am afraid that the State is not going ahead as well as one could wish in this direction. When I think of the vast extent of this country, bigger than Europe, with its almost illimitable possibilities in the way of horse-breeding, it must be admitted that so far we have not taken advantage of our natural inheritance. We possess horses of a stamp, but with few exceptions not of the right stamp, mostly weedy animals that hardly pay in some instances for the grass they have eaten when four years old. Greyhound speed now seems to be everything ; substance is sacrificed, and the qualities of soundness, staying powers, and endurance at one time famous have been bred and "improved" out of existence. First-class blood horses are not common in Western Australia and, therefore, the general knowledge of horseflesh is formed from bad specimens.

The system adopted in England by which the £5,000 hitherto provided for the Queen's Plate races might be applied with advantage in this State and indeed throughout Australia. The money is now in the hands of the "Hunters Improvement Society," which body annually awards 25 premiums of £200 each to the best hunter getting horses in the 25 districts into which the country is divided for this purpose, on condition that they are to stand for all suitable mares in their own districts at a reduced fee of £2 2s., the owner being compensated for this reduction by the premium.

Then again some system of registration of stallions advertised for public service is urgently required whereby no horse be allowed to be registered unless free from hereditary unsoundness, would, I think, be found of the greatest benefit in enabling the general public to distinguish the good horse from the bad, the sound from the unsound.

Pigs.

The swine throughout the State are on the whole in a healthy condition. In a few instances suspicious symptoms of infectious disease have shown themselves amongst the pigs in certain localities but whenever this was discovered the affected animals have been at once isolated and destroyed, by which all traces of the trouble have been stamped out as quickly as possible. It is a drastic remedy but I believe by far the most economical method in the end. Our available supply of pigs within the State is, I need not say, far below local requirements, and we still have to import largely from the other States in the way of bacon, etc. The present Regulations prohibit the introduction of live pigs into this State, owing to the continual prevalence of swine fever in the Eastern States. A trial shipment arriving here some time back met with disaster, swine fever having broken out amongst them soon after arrival, whereby some died and others had to be destroyed to stop the progress of the disease.

Sheep.

These animals have on the whole been very healthy throughout the State during the past 12 months, and there has been a substantial increase in numbers. Any mortality could generally be trace to dietetic errors and invariably ceased when these troubles were removed. A good lambing has been recorded. The dipping regulation has been duly attended to with satisfactory results ; owners are recognising its importance and the fact that not only is the wool improved, but also the condition of the sheep. Last year's wool clip was estimated at 70,000 bales and it is anticipated that this season's output will total fully 120,000.

Over 900 stud rams were landed at North-West ports during the past year for various owners, and this fact alone speaks well for the future of the sheep industry.

Miscellaneous.

The Stock Regulations have been carefully revised and brought up to date to suit the existing requirements, and have now only to obtain Executive approval to come into force. They will be an improvement on the old ones in many ways and should work with less friction in practice.

Meat Inspection should be under the Stock Department, its proper place, instead of, as at present, under the control of the Central Board of Health. This, if effected, would simplify matters. As things are now, a Meat Inspector reports any disease he may find to his authority the Central Board, which latter then notifies the Stock Department, and through such circumlocution valuable time is sometimes wasted. There is no necessity for it.

Sale and Purchase of Life Stock.

A new departure has been made in regard to the sale, purchase and transfer of live stock. This matter being now undertaken entirely by the Stock Department, which is made solely responsible for the proper transaction of this class of business, I have no doubt that in a little time this arrangement will be found to give satisfaction and work well in practice and probably be the means of saving a considerable amount of money, besides being of very great convenience to the different departments concerned who formerly undertook such affairs themselves with often loss to themselves.

The following tables showing the imports and exports of live stock at the principal ports of the State will convey an idea of how matters stand in this respect during the past 12 months.

The comparative statement showing the increase of stock which has taken place for some years back is also of considerable interest.

Stock Imported at Fremantle from 1st July, 1906, to 30th June, 1907.

From	Horses	Cattle.	Bulls.	Cows.	Mules.	Donkeys.	Sheep.	Rams.	Ewes.	Goats.	Pigs.	Dogs.	Poultry.	Pigeons.	Ferrets.	Lemurs.
Eastern States	879	3,833	70	277	...	58	93,397	4,874	2,158	150	111	109	7,192	4,552	64	...
New Zealand	...	...	...	...	...	...	25	...	...	...	...	...	...	...	...	...
England ...	...	...	7	...	...	...	...	2	10	...	...	5	25	...	...	...
America ...	...	...	...	...	6	...	12	...	..	...	...	...	13	...	...	...
India... ...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	1
South Africa	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	879	3,833	77	277	6	58	93,434	4,876	2,168	150	111	114	7,239	4,552	64	1

	£	s.	d.
The Inspection Fees collected on the above amounted to ...	680	12	6
Fines collected for introducing Stock without Certificates	5	10	0

Stock Imported at Albany during the year ending 30th June, 1907.

Horses.	Fat Cattle.	Sheep.	Dairy Cows.	Flock and Stud Rams.	Stud Bulls.	Fowls.	Goats.	Dogs.	Mixed Cattle (yearlings).
116	337	8,952	63	539	...	154	1	36	140

Fees collected on above amounted to over £100.

EXPORTS FROM FREMANTLE FROM 1ST JULY, 1906, TO 1ST JULY, 1907.

Stock.

Destination.	Horses.	Cattle.	Sheep.	Pigs.	Dogs.	Poultry.	Llamas.	Lemurs.	Opossums.	Birds
Eastern States	42	*Nil*	*Nil*	*Nil*	91	18	1	3	2	500
United Kingdom					*Nil*					..
South Africa					*Nil*					
Singapore					6					
Netherlands India					1					
Total	42				98	18	1	3	2	500

Hides, Skins, Etc.

Destination.	Hides.	Sheep skins.	Kangaroo skins.	Calf skins.	Goat skins.	Rabbit skins.	Opossum skins.	Cowhair.
		bales.	bales.					bales.
Eastern States	22,419	*Nil*	214	212	165	413	394	5
France	...	50		.	...	...		...

EXPORT CERTIFICATES.

The fees collected on the above amounted to £39.

Stock Landed at Fremantle from North-West Ports from 1st July, 1906, to 30th June, 1907.

From—	Cattle.	Horses.	Sheep.	Pigs.
Wyndham	14,589	22	...	...
Derby	4,395	2	13,724	...
Port Hedland	738	1	6,605	...
Cossack	250	17	..	...
Onslow	...	3	...	..
Carnarvon	279	75	38,445	.
Point Sampson	...	.	1,387	
Total	20,251	120	60,161	..

Increase of Live Stock in the State.

Year.	Horses.	Cattle.	Sheep.	Pigs.	Camels.	Mules and Donkeys.	Goats.
1902	80,158	437,136	2,704,880	52,883	1,519	505	11,520
1903	82,747	497,617	2,600,633	50,209	2,031	600	14,120
1904	90,225	561,490	2,853,424	70,299	1,953	840	17,980
1905	97,397	631,825	3,120,703	74,567	2,413	1,061	21,139
1906	104,917	690,011	3,332,981	56,203	2,084	1,272	21,891

J. L. BURNS, V.S.

Acting Chief Inspector of Stock.

REPORT OF INSPECTOR OF STOCK AND BRANDS.

To the Acting Inspector of Stock.

Sir,

I have the honour to submit my Annual Report in connection with the inspection of stock in the South-Western Division of the State, for the year ending 30th June, 1907.

My weekly Journals and Reports being already before you, I purpose to condense this report, and to be as brief in my remarks as possible with the information I have to convey.

During the past twelve months my travels in connection with my duties have extended over the Eastern, Great Southern, South-Western, and Midland Districts.

I am pleased to state that with the exception of a few cases of tuberculosis in cattle and pigs (which diseased animals were destroyed) strangles and influenza in horses, ophthalmia and ticks and lice in sheep, which outbreaks were brought within proper control, generally speaking the stock in the South-Western Division are in a satisfactory condition. During the months of May and June a few cases of infectious pneumonia in pigs was met with, this trouble, to my mind, being due to insanitation, and unseasonable climatic conditions. Land settlement is extending in every direction, and the flocks and herds now are many, and are increasing in numbers every year.

Sheep dipping operations for the year have been carried out as well as could be expected, and it is satisfactory to note that very few sheep are reported to have died from the effects of the dipping. During the latter part of the summer bushfires were very prevalent throughout the Eastern and Great Southern Districts, large areas of feeding country having been burnt off, which caused stock to suffer considerably from scarcity of feed.

During the latter part of the Summer and the beginning of the Winter boom prices for sheep were ruling, good sound breeding ewes in lamb being greatly in demand. The erection of a bacon factory at Fremantle has given a decided fillip to the pig-raising industry, baconers and good porkers being largely in demand. A number of stud stock have been introduced during the past year, and have found their way into the various districts; this new blood will greatly help to build up and improve the quality of our flocks and herds. Inspections of the yardings at the market sales were regularly made to the end of April, after which time I was transferred to take charge of the Fremantle District.

As you will observe from the returns already furnished, there has been a substantial increase in sheep for the year.

Last year's wool clip for the whole State was estimated at 70,000 bales, and it is anticipated that this season's output will total fully 120,000 bales (approximately).

Nice rains have fallen, and a good season is already in sight.

Lambing is progressing satisfactorily, and the percentage of lambs promises to be up to the average seasons. Grass and herbage is everywhere abundant, and the supply of fat sheep should be maintained. Stock generally continue in a satisfactory condition, and in the farming and grazing business there is an all round hopeful tone throughout the South-Western Division.

The mortality in sheep for the year amounted to $1\frac{1}{2}$ per cent. (approximately).

I have, etc.,

PERCY J. GIBBONS,
Inspector of Stock and Brands.

5th July, 1907.

REPORT OF INSPECTOR OF STOCK, GERALDTON.

To the Acting Chief Inspector of Stock.

Sir,

I beg to make the following report for your information :—

Horses.

There has been considerable mortality amongst horses during the past year, but all from local causes. The Bot Fly has been particularly active in the Greenough District, and responsible for some of the deaths. I regret to say the number of mares that abort in Dongarra and Greenough Districts is increasing, the percentage being abnormal.

Cattle

Have been particularly healthy, notwithstanding the hundreds that find their way to the Irwin and Midlands from the far North and Eastern States. At present fat cattle are being regularly landed at Geraldton from Derby.

Sheep

Throughout this huge district sheep are looking well and a good lambing assured. Ticks are troublesome at South Greenough and Dongarra, but have been enormously reduced by systematic dipping. Flies are becoming very troublesome, being particularly active this year amongst well-bred sheep, and I feel sure dipping will have to be resorted to next year as a remedy. 30,000 sheep landed at the port of Geraldton last year from Northern ports, and 5,000 are landing to-morrow. In addition to these, several hundred stud sheep were landed from the Eastern States.

Pigs

Are healthy, no cases of sickness during the past year.

General.

In conclusion, I am pleased to say the season so far is an excellent one, farmers and pastoralists being well satisfied, in fact the Victoria and Murchison Districts appear to have entered an era of prosperity.

I have, etc.,

JOSHUA MILLS,
Inspector of Stock.

REPORT ON RABBIT BRANCH.

The Under Secretary for. Agriculture.

The three rabbit-proof fences have now been constructed by the Public Works Department and handed over to me for maintenance.

The first or No. 1 fence starts at Starvation Boat Harbour, on the Great Australian Bight, 70 miles West of Esperance, and runs almost due North, crossing the Goldfields line near Burracoppin, and then right up to the ninety-mile beach, on the Indian Ocean, about twenty miles North of Condon, a total length of 1,155 miles.

The No. 2 fence, which was next constructed when it was found that rabbits had got ahead of the No. 1 fence, starts at Point Ann, 130 miles East of Albany, and runs in a Northerly direction slightly bearing Westward, crossing the Goldfields line near Cunderdin, to Yalgoo, when it turns Eastward and joins the No. 1 fence at Gum Creek, 320 miles North of Burracoppin. This fence is 724 miles in length.

The No. 3 fence starts from the No. 2 fence, about 20 miles North of Yalgoo, and runs due West to the Indian Ocean, which it joins at Bluff Point, a total length of 171 miles.

The total length of fencing now constructed is 2,050 miles, and this completes the scheme of fencing approved of to the present time.

The maintenance staff consists of a Chief Inspector, 4 Sub-inspectors, who have about 500 miles of fencing in their charge, 25 boundary riders, or about one boundary rider to each 100 miles of fencing. In the extreme North where the natives are dangerous there are 300 miles of fencing, where the boundary riders go in pairs as it is not safe for one man to travel alone. There are at present three repairing gangs grubbing and making some necessary repairs, but after this year these will not be required only under exceptional circumstances. There are two camel-drivers, who distribute rations, and three rabbiters employed in destroying rabbits.

Early in January a gang of men will be employed to the North of Northampton in trying to eradicate some colonies of rabbits that have found their way to the coastal sandhills there.

During the year rabbits were reported as having appeared inside the No. 2 fence at Coorow, on the Midland Railway ; rabbiters were immediately sent there and the rabbits destroyed, and examination made some nine months after failed to find any fresh traces of rabbits.

Rabbits were reported at Mullewa also inside the No. 2 fence, and it is believed these have also been eradicated.

The only known rabbits inside the No. 2 fence are those North of Northhampton, and it is hoped these will be completely destroyed before the summer is over.

Between the No. 1 and No 2 fences in some places rabbits are fairly numerous, especially in the Northern portion, but very few have as yet reached the No. 2 fence, only three having been reported as being caught in the traps. The tendency seems for the rabbits to make North more than West.

In the North-West to the North of the No. 3 fence and West of the No. 1 fence there are rabbits that have got ahead of the No. 1 fence ; they have been reported almost 100 miles West of the No. 1 fence in the Upper Gascoyne District. Settlers in this North-West District will need to take promp and active measures if they wish to keep the pest down.

There seems to be a tendency on the part of many settlers to expect the Government to destroy the rabbits on their properties, instead of starting to do it themselves as soon as rabbits are discovered as they are supposed to do under the Rabbit Act. The Act is being strictly enforced, and will be, and all offenders will be prosecuted.

The fences are all in good order, well maintained, and, as a rule, inspected twice a week, except in the far North, where they are inspected once a week.

On the outside of No. 1 fence rabbits are very thick in places, and in some parts they have eaten everything edible, and thousands have died of starvation. They have been reported as far North as Mount Cecilia, or within 70 miles of the Kimberley border.

The height of the netting above ground averages from 2 feet 10 inches to 3 feet, and the depth underground 6 to 8 inches, except where the ground is sandy, and then it is 12 inches below the surface. There is a top wire 12 inches above the netting, in the South this is mostly a plain wire, but where there is stock a barb wire has been used, and a number of settlers have been given permission to put in an extra barb wire between the top wire and the netting, and thus making the fence dog-proof.

Private individuals under certain conditions are allowed to join their fences to the Government fence and use it as a boundary, and for such part of the Government fence an annual rent of 25s. per mile or part of a mile is charged.

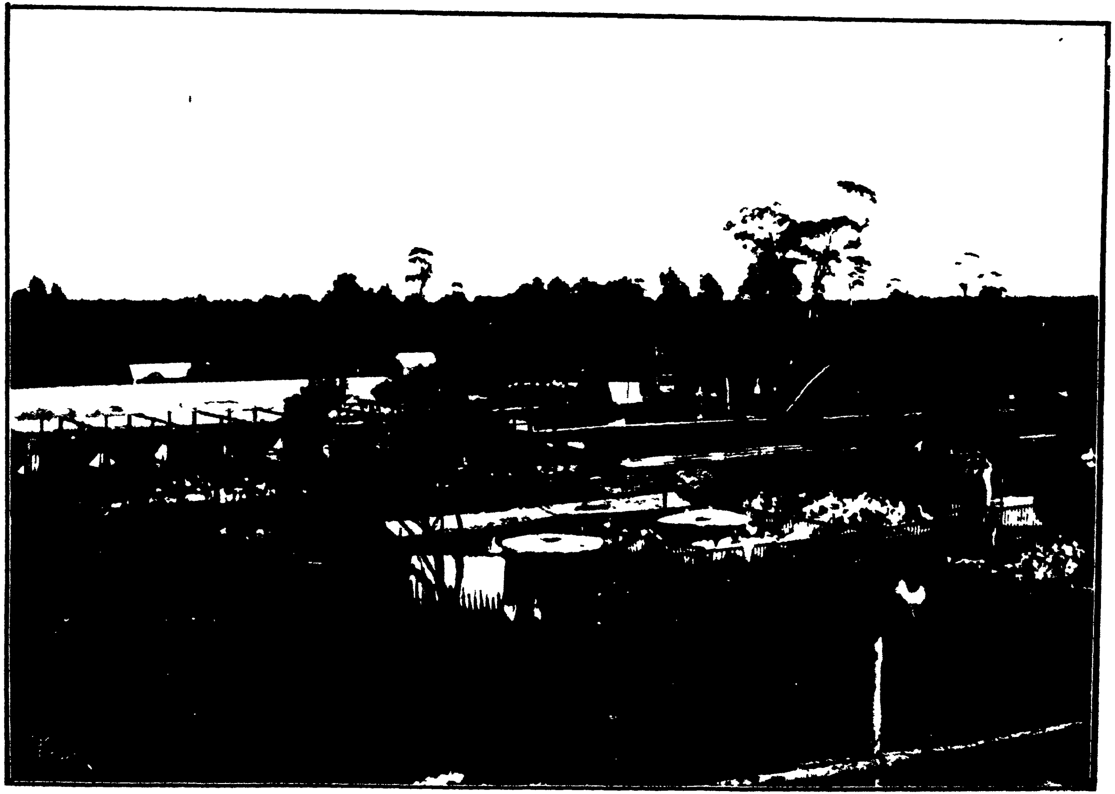
There is no traffic allowed under any circumstances on the track along the fences, and any persons found trespassing are prosecuted. The damage done to the fence by teamsters and the travelling public in vehicles was so great in the way of knocking down posts and damaging the netting that the most stringent measures had to be adopted.

At distances along the fence of about five miles yard traps are erected for catching rabbits, and in some places the rabbits were so numerous that as many as 1,500 to 1,800 rabbits would be caught in 50 miles in these traps in a month. Of late in the Southern part of the No. 1 fence the rabbits have been comparatively scarce, and in some traps only 20 or 30 a month have been caught.

To the Eastward of the No. 1 fence, South of Burracoppin, rabbits have decreased in numbers in an extraordinary degree in the past two years, and where thousands were to be found a year or two ago there are scarcely any to be seen now. At one time they were so numerous that they practically ate themselves out and starved, and fresh contingents have not yet arrived from the East.

Between the Nos. 1 and 2 fences rabbits are found in small colonies from the coast right up to the Northern end of the fence, and for a time rabbiters were employed trying to keep these in check, but as it is impossible to get the last two or three rabbits, the majority of which are always does, it was decided not to continue the rabbiters, as to be of any service it would require an army of men, and as more bucks were caught than does it was only increasing the number of young ones.

No rabbits have been found to the West of the No. 2 fence in the agricultural districts, although some have followed the Murchison River down,



Coolgardie Poultry Farm—A Modern Poultry and Duck Ranch (*see* letterpress p. 873).

and reached the coast at the South of the Murchison River at its mouth, and have then travelled as far South as Lynton, which is about 20 miles North of Northampton. Rabbiters are employed there at present, but it is found they will not be able to exterminate them, as they have gone into the thick scrub on the sand hills along the coast.

To the North of the No. 2 fence and West of the No. 1 fence in the Murchison and Gascoyne country, a good many rabbits have found their way, and in one or two instances they have actually made warrens, but from some cause or other these have mostly been deserted within a year or two.

Settlers should refrain from killing iguanas, which are most deadly enemies of the rabbit. I have found five good-sized young rabbits inside a large iguana that had been accidently killed by the buggy wheels going over it. Dingoes also kill large numbers, and so do the large hawks.

The Government has lately decided to give the Rodier system of dealing with rabbits a trial in this State. That is, killing off all the doe rabbits possible, and allowing the buck rabbits to go free. This system is so called after a squatter in New South Wales, who was the first to introduce it and who practised it on his own station near Cobar, and was able to deal with the rabbits in his run at a very small expense, while his neighbours were almost ruined by the pest.

Where the bucks are plentiful and the does scarce the males tease and worry the females to such an extent that they become sterile and do not breed, often they die and the bucks kill all the young ones they can find. In poisoning and trapping as a rule more bucks are killed than does, as from the habit that the bucks have of resorting to one place to pass their excrements it is easy to trap them, and a decrease in the bucks mean more prolific does.

It is recommended then that all persons who catch rabbits alive should allow the bucks to go free, cutting off say one ear so that in case of shooting they can be identified.

The principle is scientifically correct, and if a large number of does are destroyed the remaining bucks will do more to keep the rabbit pest down than any other measure that can be adopted. For this reason settlers destroying rabbits are recommended to try and catch all they can alive instead of poisoning or shooting.

In speaking of the prospects of the rabbits bcoming a serious pest in this State I am judging from the experience of 25 years in various parts of Australia, and from a close study of the question for some years past. With the present fences kept in good order, regularly patrolled by boundry riders, proper inspection, and the co-operation of the settlers all over the State, I am thoroughly convinced that the farmers have but little to fear and those inside of or to the West of the Nos. 1 and 2 fences, practically nothing.

That there are rabbits between the two fences, and a very considerable number, cannot be denied, and the farmers there will have a continuous, although not necessarily severe, fight to keep the pest down. The fight may be maintained by the individual with success, but it will cost him much more than if he co-operates with his neighbours. Wire netting in the holdings will cope with the rabbit and be expensive. Wire netting in groups of holdings will cope equally well with the rabbit, and at only a small proportion of the expense that would attach if each individual provided wire netting for himself ; for instance, with rabbit-proof netting at £27 per mile, for the netting alone it would cost for a 1,000-acre farm, 100 chains x 100 chains, £135.

If 10 people joined together to net 10,000 acres the cost of the netting would be £740, or to each of them £74, as against £135. If 100,000 acres were netted in, the cost of the netting would be £1,350 or £13 10s. for each 1,000 acres, and that would only represent a block of land 12½ miles x 12½ miles Thus, by co-operation, instead of the individual having to pay for the netting to fence in his 1,000 acres, £135, if 100,000 acres were fenced in by a combination of settlers, the netting would only come to £13 10s. for each 1,000 acres.

I would, therefore, strongly recommend that before any person purchased netting to fence in his holding he should try if he could not get one or more of the settlers in the district to join with him—the more the better—and thus have the work done at the minimum of cost.

But even if the rabbits did get in and become the pest they are elsewhere, the farmer can always deal with them. It is the large run holder who will suffer most, especially those who have large areas of poor country where grazing capacity is so small that it would not pay to fence in their holdings : these are those who will suffer most, and it is the squatters who have suffered most in all the Eastern States. In land that suits the rabbit up to the present the destruction of rabbits by poison, trapping, shooting, etc., on such places has not been successful without the use of netting, and so far as I can see, the most likely way and the cheapest to deal with them in our Northern pastoral country will be by the pastoralists carrying out the Rodier system for all it is worth.

It has, however, yet to be proved that the country will suit the rabbit, and observations and reports from the settlers in the North throws a certain amount of doubt on the subject.

If every settler and pastoralist accepts the fact that he is responsible for keeping his holding free from rabbits and acts up to it, I think Western Australia has but little to fear.

I would like to mention that within the past few weeks I went along a portion of the rabbit-proof fence to the North of Burracoppin where there are rabbits at the present time, and I saw a good illustration of the good the rabbit fence is doing. On the outside of the No. 1 fence there was not a blade of grass to be seen ; on the inside there was any amount of grass from three to six inches high and any amount of old feed, while on the outside of the fence the old feed had been eaten down close to the ground, and there was not enough to feed even a bandicoot. A better illustration of the value of the fence it would be difficult to find.

ALEX. CRAWFORD,
Acting Chief Inspector of Rabbits.

FRUIT CROP IN THE SOUTH-WEST.

By Geo. W. Wickens.

Apples.

From present appearances I think the apple crop in this district for 1908 will be fairly well up to the average, though there will be nothing in the nature of a heavy crop, for apples as well as other gruits suffered from the unseasonable spring weather; or, to put it more correctly, from the weather experienced at that period of the year; it could not by any stretch of imagination be called typical spring weather for we had late frosts, bleak biting winds, and the coldest of showers at a time when in ordinary seasons we are enjoying mild warm conditions. Cleopatras, Dunn's seedling, Jonathan, and Tates are showing fairly well in the majority of the orchards; and although it is yet early to say what crop will set on late flowering varieties such as Rome Beauty and Five Crown, the trees at the present time look promising.

Pears.

Pears are light to medium—Keiffer's Hybrid, Bartlett's and Fertility being amongst those that are carrying the best crops.

Peaches.

The peach crop is going to be very disappointing ; all varieties with the exception of the very early ones blossomed well and set an abundance of fruit, but the cold wintry weather which continued almost without intermittence up to the end of November had a disastrous effect on the young fruit ; after attaining the size of small marbles they stopped growing and fully two-thirds of the crop dropped off the trees.

The early varieties, Briggs, Hales, Downing, Alexandra, High's Early Canada, etc., etc., except in specially favoured situations rarely return a large crop in this district ; but this year they are even worse than usual, for in a great many instances the tops of the trees and in fact all the ends of the previous year's growth have not burst into leaf at all, the buds remaining dormant several inches from the terminals, these bare pieces of wood are now slowly withering and the young growth is coming out on the older wood. I notice that this has taken place in the orchards at the Preston Valley to a much greater extent than in the hilly country of the Blackwood. In wet undrained soils a number of peach trees, both early and late varieties, have died right down but I have not seen this happen anywhere in the higher and drier soils.

Apricots.

Apricots are too uncertain and in consequence are very little planted in this district, though I know a few places where an odd tree of Oullin's Early is bearing well. Newcastle Early, a newer variety, and not much in cultivation here, also promises better results than is obtained from some of the older sorts. Moore Park, one of the best known and most profitable apricots grown in the Eastern States, is almost a total failure here; the trees grow well but are as free from fruit as a red gum.

Japanese Plums.

Japanese Plums are doing well and have set a very heavy crop this season, nearly the only variety that is light being Wickson, and the young fruit fell off these during last month in the same way as the peaches suffered.

Cherries.

With the exception of Dr. Hackett's orchard at Donnybrook, cherries are very sparingly planted, though there are a few trees in some of the Blackwood orchards bearing fairly well; but so many disappointments have been met with, and the interval between planting and bearing is so long that growers have come to regard cherries as a costly experiment. Mr. Hawter, the well-known nurseryman and orchardist has 160 acres under fruit at Mullalyup, and is trying on a fairly large scale how cherries will do in his soil; though on account of the uncertainty attached to the experiment he is not devoting the whole space in the rows to cherries, but is planting them in between the permanent trees; up to the present he has not had any payable results.

Dr. Hackett's orchard and the success he has met with is well known, but the long continued wet and cold weather this season had a bad effect on the young fruit, and great quantities dropped off. "Black Margarets" are an exception, being very heavily laden, but the total crop will fall somewhat short of last year's.

Apples the most payable.

Nearly all orchardists realise that for this district apples grow better, bear better, and have a better and wider market than any other fruit; and the faith they have in the industry is instanced by the fact that one firm of nurserymen last winter delivered 18,000 trees in Bridgetown alone, most of which were apples of export varieties.

One of the most interesting exhibits at the Nelson Agricultural Society's annual Show held in Bridgetown, on 28th November last, was that of apples which had been cool stored in Perth in May. The prize of three guineas was given by Mr. Harry Layman, and credit is certainly due to that gentleman for taking the matter up. An object lesson of the potentialities of cool storage was given to the people of the Nelson that could hardly have been gained in a better way, nor at a more opportune time, when so many are found who, for various reasons, decry this method of storing fruit.

About forty cases were exhibited and the majority were in excellent condition. Dunn's Seedling, Tate's and Spitzenberg, being particularly good. I tasted the Yate's and found them as fresh and crisp as though they had been only gathered a few weeks.

I am greatly indebted to the courtesy of Mr. Sayers, S.M., Bridgetown, in providing me with a yearly return of the number of cases consigned at Bridgetown Station. This represents fruit grown on the Blackwood in the immediate vicinity of Bridgetown, and most of what is produced at Warren. Upper and Lower Blackwood consign at stations farther up the line. I would like to have secured comparative returns from Donnybrook Station where all the Upper Preston fruit is consigned, but I was unable to do so for no record of the number of cases was available.

Fruit Record from Bridgetown Railway Station.

Month		1903		1904		1905		1906		1907
		cases.		cases.		cases.		cases.		cases.
January	..	1350	..	1404	..	2133	..	2659	..	3064
February	..	1373	..	1803	..	1978	..	2634	..	3466
March	..	1542	..	2833	..	3207	..	4536	..	3713
April	..	2390	..	3092	..	3218	..	4591	..	4734
May	..	1686	..	2808	..	3468	..	5131	..	4631
June	..	784	..	1600	..	1887	..	2052	..	3728
July	..	258	..	639	..	1257	..	1158	..	2000
August	..	170	..	305	..	619	..	598	..	858
September	..	38	..	89	..	168	..	75	..	362
October	..	—	..	37	..	12	..	9	..	9
*November	..	—	..	—	..	—	..	11	..	3
December	..	111	..	108	..	276	..	596	..	—
		9702	..	14718	..	18223	..	24050	..	26568
Increase	..	—	..	5016	..	3505	..	5827	..	2518

*To 30th November.

POULTRY NOTES.

SECOND EGG-LAYING COMPETITION AT SUBIACO.

[Commenced July 1, 1907.]

The following are the results up to November 30:—

The figures in black indicate the highest for the month.

The first column of figures shows the present position of the pens in the competition.

FOWLS.

Six pullets and one male bird in each pen.

	Owners and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Total.
1	J. Stuart, Golden Wyandotte	**126**	143	146	152	132	699
2	J. and T. Robertson, White Leghorn ...	111	137	150	152	147	697
3	Sunnyhurst (S.A.), White Leghorn ...	78	150	**153**	158	**148**	687
4	A. H. Padman (S.A.), White Leghorn ...	106	145	147	**165**	122	685
5	O.K. Poultry Yards, White Leghorn ...	116	141	140	144	135	676
6	J. D. Wilson, Brown Leghorn	117	129	140	143	137	666
7	Craig Bros., White Leghorn	99	137	140	151	136	663
8	Mrs. H. M. Kelley, Golden Wyandotte ...	123	141	148	124	123	659
9	S. Craig, White Leghorn	108	130	141	151	128	658
10	C. R. Herbert, White Leghorn	101	138	147	138	126	650
11	F. Mason, White Leghorn	115	127	140	138	122	642
12	Scottish-American P.F., White Leghorn ...	81	115	142	149	145	632
13	Mrs. H. J. France, White Leghorn	60	135	145	149	138	627
14	O. James, White Leghorn	87	140	131	129	137	624
15	Mrs. M. Hughes, White Leghorn ...	62	137	143	145	134	621
16	Mrs. McGree, White Wyandotte	66	135	140	148	132	621
17	North Lake Egg Farm, White Leghorn ...	103	125	143	141	108	620
18	Coolgardie Poultry Farm, White Leghorn	87	126	136	141	128	618
19	Glendonald P.F., Golden Wyandotte ...	74	**159**	141	119	123	616

FOWLS—*continued.*

	Owners and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Total.
20	Perth Poultry Farm, White Leghorn ...	97	115	134	142	128	616
21	J. Faulkner, White Leghorn	77	129	136	135	126	603
22	G. George, White Leghorn	91	100	138	140	134	603
23	L. Dobson, Silver Wyandotte	119	132	127	131	91	600
24	Savage and Jones, White Leghorn ...	104	109	131	140	113	597
25	White Wings P.Y., White Leghorn ...	106	76	141	141	132	596
26	A. and G. Buttsworth, Black Orpington ...	107	116	128	134	109	594
27	Austin and Thomas, White Leghorn ...	88	100	131.	149	125	593
28	J. R. Parkes, Brown Leghorn	94	104	132	138	120	588
29	E. E. Ranford, Minorca	67	122	136	141	117	583
30	C. W. Johnson, White Leghorn	65	111	131	139	135	581
31	Bassett and Titterton, White Leghorn ...	75	136	136	120	110	577
32	Chas. Thomas, White Leghorn	90	106	131	139	109	575
33	Digby Poultry Yard, Brown Leghorn ...	53	121	136	134	128	572
34	Adelaide Yard, White Leghorn	67	97	133	134	127	558
35	G. A. Innes, White Leghorn...	44	82	144	140	146	556
36	R. A. Dusting, Minorca	51	118	121	133	128	551
37	B. Tonkin, White Leghorn	68	101	126	127	121	543
38	F. E. Tull, White Leghorn	85	114	113	114	115	541
39	Master Staines, R.C. Brown Leghorn ...	58	126	124	123	109	540
40	Adelaide P.Y., R.C. Brown Leghorn ...	56	98	129	132	123	538
41	Mrs. H. M. Kelley, White Leghorn ...	40	100	125	136	129	530
42	B. Jones, White Leghorn	16	100	135	152	122	525
43	Scottish-American P F., Brown Leghorn ...	66	102	106	128	122	524
44	A. F. Farrant, Buff Orpington	120	121	107	98	77	523
45	A. F. Farrant, Partridge Wyandotte ...	108	115	108	109	83	523
46	E. Krachler, Rose Comb Brown Leghorn ...	73	111	123	114	92	513
47	J. Stuart, Buff Orpington	76	132	125	94	74	501
48	Sunnyhurst (S.A.), Black Orpington ...	61	111	119	114	95	500
49	O.K. Poultry Yard, R.C. Brown Leghorn ...	66	112	113	104	84	479
50	A. F. Farrant, White Wyandotte	70	111	123	106	65	475
51	L. Despeissis, Houdan	64	73	82	127	124	470
52	G. M. Buttsworth, White Leghorn	51	125	97	101	93	467
53	J. Stuart, Silver-pencilled Wyandotte ...	27	125	122	98	90	462
54	Buff Poultry Farm, Buff Orpington ...	57	99	100	111	88	455
55	A. F. Spencer, White Leghorn	27	62	102	133	128	452
56	J. Stuart, White Rocks	65	99	104	110	73	451
57	Thamar Poultry Farm, White Leghorn ...	50	104	91	95	83	423
58	Jas. Kirk, Silver Wyandotte...	50	118	102	71	80	421
59	Honnor and Forbes, Minorca	12	91	129	103	84	419
60	Craig Bros., Black Orpington	23	80	110	111	93	417
61	D. Young, Black Orpington	14	73	118	96	105	406
62	W. R. Read, Golden Wyandotte	49	89	103	91	73	405
63	Mrs. E. Byass, Salmon Faverolles	29	54	96	87	78	344
64	Non-competitive, crossbreds	0	62	81	85	78	306
	Totals	4,696	7,272	8,092	8,137	7,260	35,457

Winner of first monthly prize, J. Stuart, Golden Wyandotte, 126 eggs; second month, Glendonald Poultry Yard (E. W. Stanes), 159; third month, Sunnyhurst, White Leghorn, 153 eggs; fourth month, A. H. Padman, 165 eggs; fifth month, Sunnyhurst, White Leghorn, 148 eggs.

Winner of first three months' test, J. Stuart, Golden Wyandotte, 415 eggs.

DUCKS.

Six ducks and one drake in each pen.

	Owners and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Total.
1	G. Thomson, Indian Runner	160	177	163	171	164	835
2	R. A. Dusting, Indian Runner	114	182	167	177	169	809
3	Mrs. H. J. France, Indian Runner	145	156	161	161	159	782
4	Scottish-American P.F., Indian Runner ...	120	175	158	168	161	782

Ducks—*continued.*

	Owners and Breed.	July.	Aug.	Sept.	Oct.	Nov.	Total.
5	F. King, Indian Runner	109	174	165	164	161	773
6	Adelaide Poultry Yard, Indian Runner ...	47	160	173	171	163	714
7	Austin and Thomas, Indian Runner ...	119	137	148	134	145	683
8	White Wings P. Yard, Buff Orpington ...	60	158	157	155	147	677
9	L. Mellen, Indian Runner	44	137	165	160	164	670
10	A. J. Walters, Buff Orpington	93	135	130	162	147	667
11	South Perth P. Co., Pekin (No. 2)	35	157	170	149	142	653
12	C. W. Johnson, Indian Runner	105	136	129	122	157	649
13	Smith and Davenport (Vic.), Indian Runner	0	129	166	182	168	645
14	D. F. Vincent, Indian Runner	49	109	158	175	150	641
15	M. Kynaston, Indian Runner	75	99	144	142	136	596
16	S. A. McColl, Buff Orpingtons	11	127	155	154	141	588
17	E. Trenberth, Pekins	8	88	173	173	143	585
18	J. and T. Robertson, Indian Runner ...	54	117	123	137	105	536
19	T. Anderson, Indian Runner	11	32	165	170	158	536
20	North Lake Egg Farm, Indian Runner ...	0	58	157	157	155	527
21	South Perth Poultry Co., Pekin (No. 1) ...	0	68	165	152	140	525
22	Bon Accord, Buff Orpingtons	9	1	113	170	128	421
	Totals	1,368	2,712	3,405	3,506	3,303	14,294

Winner of first monthly prize of 10s., G. Thomson, Indian Runner, 160 eggs; second month, R. A. Dusting, Indian Runner, 182; third month, Adelaide Poultry Yard, Indian Runner, and E. Trenberth, Pekin, equal, 173 eggs; fourth month, Smith & Davenport, Indian Runner, 182 eggs; fifth month, R. A. Dusting, Indian Runner, 169 eggs.

Winner of first three months' test, G. Thomson, Indian Runner, 500 eggs.

THE FERTILISER ACT.

The Inspector of Fertilisers, Mr. P. Wicken, reports having received from the Government Analyst a further list of analyses of fertilisers taken in connection with the Fertilisers and Feeding Stuffs Act. This list completes all the samples taken up to the present time.

For the benefit of those who wish to compare the value of these fertilisers, the cash value on a unit basis is given for the registered samples and results as found by the Government Analyst.

The unit values are as follow:—

Ingredient.	Form.	Value per unit.	
		s.	d.
Nitrogen ...	In form of nitrates (nitrate of soda)	17	9
Do ...	do sulphate (sulphate of ammonia)	17	6
Do ...	Inorganic matter (blood and bone manures)	15	3
Potash	As sulphate	5	10
Do ...	As muriate	4	6
Phosphoric Acid	Water soluble	5	2
Do ...	Citrate soluble	3	6
Do ...	Acid soluble	3	3
Do ...	In Thomas's Phosphate without regard to solubility ...	3	5

The value of the fertiliser is obtained by multiplying the percentage of each ingredient contained by the unit value of that ingredient.

ANALYSIS OF FERTILISERS.

	Number of Sample.	Name of Fertiliser.	Where obtained.	Nitrogen.	Water Soluble Phosphoric Acid.	Citrate Soluble Phosphoric Acid.	Acid Soluble Phosphoric Acid.	Total Phosphoric Acid.	Potash.	Value on Unit Basis. £ s. d.
Guaranteed analysis	165	Fertiliser Champion, No. 5 ...	C. Neumann, Albany	3·3	12·00	...		12·00	7·00	7 12 1
Found by Government Analyst ..	165	Do.	do. do.	4·84	...	...	11·78	11·78	5·3	7 2 10
Guaranteed analysis	154	IXL Fertiliser No. 2	Barnett & Co., Albany	3·75	18·25	...	...	18·25	...	7 11 5
Found by Government Analyst ...	154	Do. do.	do. do.	3·25	...	...	19·4	19·4	...	5 12 8
Guaranteed analysis	159	Superphosphate, St. George ..	Drew, Robinson, & Co., Albany ...	...	16·4	...	...	...	..	4 4 8
Found by Government Analyst ...	159	Do. do.	do. do. ...	...	19·04	...	...	...	...	4 18 4
Guaranteed analysis	160	Nitrate of soda	do. do. ...	16·00	...	...	...	...	...	14 4 0
Found by Government Analyst ...	160	Do.	do. do. ...	15·07	...	...	...	...	...	13 7 5
Guaranteed analysis	162	Sulphate of ammonia	do. do. ...	20·00	..	...	...	...	...	17 10 0
Found by Government Analyst ...	162	Do.	do. do. ...	20·78	.	...	...	...	...	18 3 7
Guaranteed analysis	164	Sulphate of potash, Champion	C. Neumann Albany	.	...	...	...	...	50·00	14 11 8
Found by Government Analyst ...	164	Do. do. ...	do. do.	...	...	...	...	...	50·23	15 4 8
Guaranteed analysis	169	No. 1 superphosphate	Gardner Bros., Perth	..	18·50	1·25	1·00	20·75	...	5 3 2
Found by Government Analyst ...	169	Do.	do. do.	..	19·55	·69	·59	20·83	...	5 5 3
Guaranteed analysis	170	Nitrate of soda	J. M. Drummond, & Co., Perth ...	13·00	..	...	...	...	...	11 10 9
Found by Government Analyst ...	170	Do.	do. do. ...	11·11	...	...	...	...	...	9 17 2
Guaranteed analysis	168	Potash manure, Champion ...	C. Neumann, Albany	...	...	...	...	...	30·00	8 15 0
Found by Government Analyst ...	168	Do.	do. do.	..	..	...	...	...	24·42	7 2 5
Guaranteed analysis	179	Potash manure	Gardner Bros., Perth	·80	15·50	·50	1·00	17·00	2·16	5 9 10
Found by Government Analyst ...	179	Do.	do. do. ...	1·36	15·75	·02	2·26	18·03	2·71	6 5 2
Guaranteed analysis	180	Sulphate of Ammonia	do. do.	20·00	...	...	...	...	...	17 10 0
Found by Government Analyst ..	180	Do. . ..	do. do.	20·37	.	...	...	...	...	17 16 5
Guaranteed analysis	181	Bonedust	Wing Yick & Co., Perth ..	3·75	...	...	18·3	18·3	...	5 16 7
Found by Government Analyst ...	181	Do.	do. do. ..	3·61	...	...	14·18	14·18	...	5 1 0
Guaranteed analysis ..	182	Bee fertiliser (Ockerby & Co.)	Lehmann & Co., Fremantle	3·00	...	5·00	9·14	14·75	...	4 15 1
Found by Government Analyst ...	182	Do.	do. do.	4·00	...	4·85	12·81	17·66	...	5 19 6

Guaranteed analysis	183	Pelican fertiliser	Kitchen & Co., Fremantle	3·00	...	5·62	9·14	14·76	...	4 15 1
Found by Government Analyst ...	183	Do.	do. do.	3·72	...	3·41	14·85	18·26	...	5 16 10
Guaranteed analysis	184	Sulphate of ammonia	Felton, Grimwade, & Bickford, Fremantle	20·00	...	...	...	...	...	17 10 0
Found by Government Analyst ...	184	Do.	do. do.	20·44	...	...	...	...	...	17 17 8
Guaranteed analysis	185	Sulphate of potash	W. Padbury, Guildford	...	...	...	...	...	52·00	15 3 4
Found by Government Analyst ...	185	Do.	do. do.	...	...	...	...	...	50·73	14 15 11
Guaranteed analysis	186	Nitrate of potash, Peerless	do. do.	15·00	...	...	...	...	...	13 6 3
Found by Government Analyst ...	186	Do.	do. do.	15·8	...	..	...	...	...	14 0 5

THE COMING WHEAT CROP.

Sir,

The Government Statistician, in a report on the possibilities of the coming wheat crop states :—

"I beg to forward herewith, for your information a forecast of this season's wheat, oat, and hay crops of this State based on reports supplied by the Land Inspectors in the various districts of the South-Western Division. I have every reason to think that the estimate is a very moderate one, and that the actual figures, when the harvest statistics are collected early next year, will prove higher than the ones here submitted. The acreage reported to be under hay appears to be slightly under that for the previous season, and if this represents the state of this crop correctly, it may possibly be accounted for by the early promise of a more remunerative wheat harvest, which may have induced many famers to devote most of their attention to the wheat crop. In spite, however, of this apparent falling off in the acreage, the prospects of the yield are reported to be so good that the total production should, as the figures show, exceed last year's. As regards the wheat harvest, all the anticipations are most favourable, the Victoria, Northam, Wagin, Williams, and York districts being all represented as showing distinct increases in the areas under crop, with estimates of particularly high average yields in the Northam, Beverley, Pingelly, Blackwood, and Sussex districts.

Oats do not show an increase quite as substantial as was anticipated, owing possibly to the superior attractions offered by the wheat market about seed time, in consequence of which the principal wheat growing districts, viz. Northam and York, it would appear, considerably reduced their oat areas. It is satisfactory, however, to notice that along the Great Southern Line, where the country is pre-eminently adapted for the growth of this cereal, viz., between Beverley and Albany, some 2,000 acres more appear to have been sown."

Forecast of the Wheat, Oats, and Hay Crops.
Western Australia.

Wheat.

Season, 1906-7.			Season 1907-8 (Forecast).		
Area.	Production.	Average per acre.	Area.	Production.	Average per acre.
Acres 250,283	Bushels 2,758,567	Bushels 11·0	Acres 288,000	Bushels 3,492,000	Bushels 12·1
			Oats.		
28,363	457,155	16·1	29,000	516,000	17·8
			Hay.		
149,830	Tons 158,112	Tons 1·1	140,000	Tons 160,000	Tons 1·14

NOTES ON THE CHAPMAN DISTRICT.

By T. Hooper, C.I.O.

During my recent visit to the districts of Narra Tarra and Northampton, I was more than ever impressed by the improvements that have taken place in these districts since the Government experimental farm demonstrated the suitability of this part of the State for the growing of cereals. Leaving Mr. J. Lander's home early in the morning, I took the road direct to the Chapman farm, and it was a treat to pass field after field of waving corn just about up and ready for the harvester. Passing one field in particular about three miles from the Chapman farm, I went into the corn to test its height, and found the topmost ears level with the top of my head, or about 5 feet 6 or 7 inches high. It was a very evenly grown crop, and must have averaged about 5 feet three inches; the plants are thick and sturdy, and the ears large and full. The soil, a red sandy loam, similar to millions of acres in this district. I called in at the Chapman farm, but did not examine any of the crops closely. I saw some fields in the distance which looked exceptionally well, although the manager, Mr. White, informed me that those particular fields were some of the poorest land on the farm. Passing from there into Sandy Gully, about 10 miles on the other side of Northampton, one was again pleased with the lovely view of fields of corn stretching away into the distance. The soil is the same red sandy loam, and the crops bear the same testimony to its fertility. One thing struck me and that was the standing grain had a more golden hue than is generally the case with Western Australian cornfields, and was more of the appearance of English cornfields. I do not know the reason, it may be the climate or it might have been the variety of wheat.

In the way of game, I came across three kangaroos, two emus and about 2 dozen turkeys, which I suppose would not be considered bad sport if one was out shooting. What you do see when you haven't got a gun !

FARM NOTES FOR JANUARY.

By Percy G. Wicken.

By the time these notes appear harvesting operations will be nearing completion except perhaps in a few of the later localities. The farmer's work however, is not ended, as there remains plenty to do in the way of threshing, winnowing, chaffcutting, etc. The modern complete harvester no doubt minimises the work, and the farmer is thereby enabled to cart his wheat straight from the harvester to the mill instead of, as with the old stripper, having to winnow it before selling.

Many of the settlers are, this year, sending their chaff away as soon as possible, but those who intend to stack until later should get their stacks thatched as soon as possible, so as to protect them from any rain that may happen to fall, and should also plough fire-breaks around the stacks as a protection against fire. As soon as the harvesting machinery is finished with, it should be dismantled and thoroughly cleaned and given a good coat of oil before it is put away. This will prevent the working parts from rusting, and leave it in good condition for next season. Most farmers have considerable sums of money invested in machinery, and give but very little attention to this machinery. The result is that more of it is spoilt through neglect and rust than in harvesting crops. Before wheat is sent away from the farm it will pay to put it through a grading machine, as by this means the weeds and foreign seed, as well as the shrivelled grain, are extracted and only first-class samples of wheat are put into the sack. The shrivelled grains and foreign seeds can all be used for feeding pigs or sheep. The increased price which is obtainable for graded wheat, especially when sold for seed purposes, will more than repay the cost of grading.

Farmers who harvest all their crops with a stripper would do well, after they have finished stripping, to put the binder through the straw and make a few stacks as a reserve for stock in case feed runs short or their grass is destroyed by bush-fires.

Sowing operations during the month, so far as farmers are concerned, are practically *nil,* the principal work, after harvesting operations are completed, being scarifying the fallow land preparatory to sowing grain prior to the autumn rains.

The bot fly is likely to cause trouble to horses during this time of the year. This fly lays its eggs on the jaw and shoulders of the horse. The animal licks them off and the eggs hatch out in its stomach. When once the larvæ of the fly get into the intestines of the horse very little can be done to dislodge them; consequently the best thing to do is to prevent these larvæ from obtaining an entrance. If the jaw and shoulder of the horse are well washed every night, and rubbed with carbolic oil, the fly will not rest on them, as the smell of this oil is objectionable to it. When the animal swallows the eggs the grubs hatch out and attach themselves to the intestines, and feed from the juices of the stomach, often causing its loss.

Mr. Weir, Chief Inspector of Stock, has recommended the following drench:—

When bots are likely to be present, and there are no symptoms of pain, the following treatment should be given:—

Sulphate Iron	1oz.
Sulphate Copper ..	1oz.
Tartar emetic	1½oz.
Arsenic	1dr.

This compound should be divided into twelve parts and one administered daily. On the fourteenth day after the animal has been prepared with mashes, a physic ball should be given from four eight drachms, depending on the size of the horse.

Nourishing food should be given and the animal's condition improved as much as possible.

When the animal appears to be suffering, same may be relieved by administering the following drench:—

Tincture of Opium	1oz.
Spirits of Turpentine ..	1oz.
Linseed Oil	1pt.

This latter may be repeated 24 hours after when necessary as a tonic, administered if the medicine has taken effect, such as Yentian or Sulphate of Iron, in doses ½oz. daily.

GOVERNMENT LABOUR BUREAU.

NOVEMBER REPORT.

The Superintendent of the Government Labour Bureau reports as follows on the work of the Bureau for the month of November:—

PERTH.

Registrations.—The total number of men who called during the month in search of work was 620. Of this number 291 were new registrations and 329 renewals, i.e., men who called who had been registered during the year prior to the month of November. The trades or occupations of the 620 applicants were as follows:—Labourers 131, handymen 80, farm hands 55, handy lads 45, cooks 34, bushmen 22, carpenters 21, dairymen 14, gardeners 12, horse-drivers 12, clerks 11, engine-drivers 11, grooms 11, firemen 10, shearers 10, miners 9, yardmen 9, bricklayers 8, station hands 8, sailors 8, fitters 7, painters 7, bakers 6, teamsters 6, kitchenmen 5, blacksmiths, engineers hotel hands, and orchards 4 of each, caretakers 3, sawmill hands 3, brickmakers, cabinet-makers, electricians, gardeners (market), orderlies, plumbers, printers, stonemasons, strikers, storemen, and wheelwrights 2 of each, and 24 miscellaneous.

Engagements.—The engagements for the month totalled 215. The classification was as follows:—Farm hands 51, handymen 26, labourers 21, dairymen 11, carpenters 10, bushmen 9, cooks 9, woodcutters 9, boys for farms 8, gardeners 7, handy lads 6, fencers 5, yardmen 5, grooms 4, kitchenmen 4, station hands 4, sailors 3, drivers, market gardeners, shearers, and teamsters 2 of each, and 15 miscellaneous.

KALGOORLIE.

Registrations.—The registrations were 28 and the renewals 8, total 36. The classification was as follows:—Labourers 11, handymen 7, handy youths 6, engine-drivers 4, miners 4, fireman, grooms, gardeners, and plumbers 1 of each.

Engagements.—The engagements numbered 9, viz., labourers 4, miners 3, handymen and handy youths 1 of each.

The female servants who called numbered 13. There were 10 new registrations and 3 renewals. The classification was as follows:—Generals 3, housemaids 3, cooks 3, barmaids 2, kitchenwomen and waitresses 1 of each. There were two engagements, viz.:—1 general and 1 kitchenwoman.

NORTHAM.

Registrations.—There were 32 applicants for work, classified as follows:—Farm hands 15, labourers 10, cooks 2, clearers 2, handymen 2, and stockman 1.

Engagements.—The engagements for the month numbered 8, viz.:—Farm hands 6, cooks and labourers 1 of each.

WOMEN'S BRANCH, PERTH.

Registrations.—The new registrations for the month were 51 and the renewals 63, total 114. The classification was as follows:—Laundress-charwomen, 23, generals 19, cooks 16, housemaids 15, light generals 12, housekeepers 9, waitresses 6, useful girls 4, lady-helps, married couples, and kitchenmaids 2 of each, and 4 miscellaneous.

Engagements.—The engagements numbered 76, classified as follows:—Laundress-charwomen 44, generals 13, cooks 5, light generals 3, cook-laundresses, housemaids, and useful girls 2 of each, and 5 miscellaneous.

GENERAL REMARKS.

The number of individual men who called at the central office, Perth, during the month in search of work was 620. This total is 98 short of that for October, and 13 short of the number for November last year. The engagements totalled 215, of which 206 were by private persons. This number is one short of that for October, and 36 in excess of the total for November last year.

During the month there were 47 men assisted by railway passes from the Central Office, Perth. The fares refunded totalled £20 12s. 3d., and the sum of £20 4s. 3d. was received from employers to send men, also £4 7s. 9d. to send women. At Kalgoorlie branch 3 men were assisted by passes, and the sum of £3 13s. 4d. was refunded. The whole amounting to £48 17s. 7d.

At Kalgoorlie branch the applicants for work were 49 (36 men and 13 women), and at Northam branch 32 men. The engagements at Kalgoorlie were 11 (9 men and 2 women), and at Northam 8.

At the Women's Branch, Perth, 114 women called during the month; the number is 10 short of that for October, and 24 short of the total for November last year. The engagements were 76, this being 14 in excess of the number for October, and 10 short of that for November last year.

LOCAL MARKET REPORT.

Market Report of the W.A. General Produce Company for the week ending Wednesday, 4th December, 1907:—Business during the past week very good. Supplies rather irregular and values fluctuating greatly: full stock. Detailed particulars as follows: Bacon good supplies, values moderate, and incline to remain steady. Hams selling well for forward delivery, prices as yet considered fair; higher values likely to rule. Butter, good supplies, selling freely at quotations. Cheese, good demand, values slightly easier. Eggs, local supplies keep up well, with values slightly higher. Potatoes, local, new, good supplies, quality and size very mixed, hence values irregular, and fluctuations will continue. Onions, imported lots, fairly plentiful ; local new, many lots offering, but not fit to carry; values fairly low. Chaff, good supplies, values much easier owing to the export demand having eased considerably. Wheat, still very little offering, as growers are expecting higher prices than at present ruling. Fruit, early summer varieties have now started, and supplies will increase from day to day; values now fairly high, gradual fall will eventuate as supplies increase. Poultry, birds young and fleshy for killing requirements in good demand. Other sorts hard to sell.

Farm and Diary Produce.—Bacon, prime, sides from 10¼d. to 10½d. lb. Hams, best Pine Apple brand, 1s. 2½d. to 1s. 3d. Butter, Milawa, 12½d.; Rose, 1s. ; other sorts, 10d. to 11½d. lb. Lard, in one pound packets, 7½d. to 8d. Cheese, medium, 8d.; loaf, 8½d. Eggs, country, local, 10½d. to 1s.; suburban, 1s. 1d. to 1s. 2d. Potatoes, local, from £6 to £9 ton. Onions, 6s. 6d. per cwt. Chaff, £3 5s., £3 12s. 6d., £4 2s. 6d. to £4 12s. 6d. ton. Bran, from £7 10s. to £8 5s. ton. Pollard, from £7 10s. to £8 5s. ton. Flour, £11 10s. to £12 ton. Oats, from 3s. 3d. to 4s. 6d. bushel. Maize, worth 4s. 6d. per bushel. Wheat, worth 5s. 3d. to 6s. bushel. Oil-cake, £9 10s. to £10 ton.

. *Fruit.*—Oranges, from 10s. 6d. to 21s. per case. Lemons, from 6s. to 12s. per case. Loquats, from 5s. to 15s. 6d. per case. Cherries, 12s. 6d. to 20s. per case. Bananas, 18s. to 22s. per case. Figs, from 6s. 6d. to 9s. per tray. Apricots, from 6s. 6d. to 12s. 6d. per quarter case; 15s. to 30s. for full case. Cape Gooseberries, 4d. to 5d. lb. Strawberries, 7s. 6d. to 12s. per doz. punnets. Apples, from 12s. 6d. to 19s. per case. Gooseberries, green, 5s. to 7s. 6d. per quarter case.

Vegetables.—Cabbage, from 2s. 6d. to 6s. per cwt. Carrots, from 6d. to 1s. per doz. bunches. Parsnips, from 9d. to 1s. 3d. per doz. bunches. Turnips, white, from 6d. to 1s. 6d. per dozen bunches; Swedes, 1s. to 1s. 6d. per dozen bunches. Beans, French, ½d. to 1½d. lb. Peas, green, from ½d. to 2d. lb. Marrows, 9d. to 2s. 6d. doz. Rhubarb, ½d. to 2½d. per lb.

Salads and Herbs.—Lettuce, from 6d. to 1s. 6d. per quarter bag. Spring Onions, from 3d. to 5d. per bundle. Beetroot, from 6d. to 1s. per doz. bunches. Cucumbers, from 6d. to 2s. per doz. Tomatoes, from 4s. to 7s., 9s., 12s. to 15s. case. Celery, from 1s. to 2s. 6d. per doz. heads. Cress, from 9d. to 1s. per bundle. Radishes, from 3d. to 6d. per dozen bunches. Thyme, from 2s. to 2s. 6d. per tray. Marjoram, from 2s. to 2s. 6d. per tray. Sage, from 2s. to 2s. 6d. per tray. Mint, 3d. per bundle. Parsley, 3d. per bundle.

Poultry (for killing).—Fowls, best table birds, 5s. to 6s. 6d. per pair.; other lots from 3s. to 4s. 9d. per pair. Chickens, 2s. to 2s. 6d. per pair.

Ducks, 3s. 9d. to 5s. 6d. per pair. Geese, worth 8s. to 9s. per pair. Turkeys, gobblers, from 15s. to 20s. per pair; hens from 9s. to 11s. 6d. per pair.

Sundries.—Corn Sacks, second-hand, 6s. doz. Bran Bags, second-hand, 4s. dozen. Bonedust, £7 10s. per ton. Phosphate, £4 10s. to £5 per ton. Guano, £4 to £5 10s. per ton. Ammonia, 20s. per cwt. Nitrate of Potash, 17s. per cwt.

NOTES ON THE CLIMATE FOR THE MONTH OF NOVEMBER, 1907.

The climate of this State south of the Tropics is regulated to a very great extent during the summer months by the track which the "lows" of tropical origin take after recurring and moving in a south-easterly direction.

Should their track carry them down our west coast, then hot, sultry weather is experienced throughout, though temperatures may possibly be lower over the Fields than in coastal districts. On the other hand, should they strike the north-west coast and journey thence overland through the Murchison and Coolgardie goldfields, then those districts are visited by the unpleasant weather and it remains fairly cool in coastal districts.

This month the "lows" have followed the latter course and high temperatures with thundery conditions have prevailed inland, while the west and south-west coastal districts have enjoyed fine, pleasant weather on the whole.

Several times during the month squally weather was experienced in southern districts with showers throughout the south-west and south. This was caused by the passage of a "low" along the southern ocean. It is rather curious to note that the inland "low" has persisted until the appearance of one of the southern "lows." It has then generally begun to move rapidly south-eastwards, joining forces with the latter at the head of the Bight, and the two combining as one have advanced upon South Australia.

In the Tropics barometers were lower than usual, but south of these above normal. (A record high barometer for November was registered at the Observatory on the 3rd, 30.491.)

Temperatures were below normal throughout. At the Observatory the mean daily maximum was 1.2 degrees, and at the Gardens 3.3 degrees, lower than the average, while the mean maximum was 1.3 degrees and 1.8 degrees lower respectively. The absolute maximum at the Observatory was 87.9 degrees on the 17th, the lowest recorded in November at the Observatory since 1899, when, however, the weather was exceptionally cool, and only twice during the month did the maximum rise over 80 degrees, the highest being 82.1 degrees. Records at the Gardens show that a number of previous Novembers have been as cool or cooler than this one. The usual high temperatures have been registered in the North-West and Tropics (Marble Bar being highest with 114 degrees.) With the exception of the extreme South-West and South, the rainfall has been less than usual south of latitude 28. North of there no rain is recorded except in East Kimberley and East Murchison.

W. E. COOKE,
Government Astronomer.

Perth Observatory,
11th December, 1907.

The Climate of Western Australia during November, 1907.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						November, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan 1.
North-West and North Coast:	Wyndham ...	29·819	29·846	30·075	29·654	98·8	81·5	90·2	104·2	75·4	98·4	81·0	111·6	69·2	150	4	3,060
	Derby ...	29·830	29·859	30·029	29·681	98·0	76·4	87·2	106·0	66·6	98·7	76·7	112·5	66·8	*Nil*	...	2,401
	Broome ...	29·852	29·861	30·026	29·717	93·7	74·3	84·0	100·8	61·6	93·2	76·1	111·0	67·4	*Nil*	...	2,370
	Condon ...	29·852	29·868	30·102	29·147	96·3	67·2	81·8	107·6	62·0	94·6	68·6	112·8	49·2	*Nil*	...	1,011
	Cossack ...	29·835	29·873	30·100	29·670	98·0	71·0	84·5	109·0	61·0	98·0	71·1	111·7	57·6	*Nil*	...	2,028
	Onslow ...	29·922	29·896	30·122	29·768	89·1	65·3	77·2	103·0	60·2	93·7	65·3	110·0	50·0	*Nil*	...	874
	Winning Pool	29·912	...	30·159	29·723	95·8	61·8	78·8	106·0	57·6	...	...	...	...	12	1	1,173
	Carnarvon ...	29·991	29·974	30·192	29·738	81·0	63·9	72·4	99·5	56·4	81·4	64·8	109·1	50·4	*Nil*	...	1,137
	Hamelin Pool...	29·962	29·949	30·225	29·774	87·4	56·8	72·1	96·6	46·2	89·2	59·8	109·0	46·6	*Nil*	...	874
	Geraldton ...	30·036	30·016	30·359	29·775	76·0	55·6	65·8	93·8	46·0	76·7	57·7	103·8	45·0	3	1	2,342
Inland:	Hall's Creek ...	29·838	29·861	30·099	29·633	100·5	73·0	81·8	107·4	60·4	100·9	74·5	109·4	56·4	124	3	1,981
	Marble Bar ...	...	...	...	...	104·5	73·4	89·0	114·0	63·6	105·5	73·0	116·4	59·8	*Nil*	...	983
	Nullagine ...	29·837	29·834	30·191	29·637	100·7	67·7	84·2	108·0	54·2	102·1	69·6	114·0	52·0	*Nil*	...	873
	Peak Hill ...	29·891	29·862	30·299	29·645	90·2	63·7	77·0	101·2	46·4	94·1	66·9	106·5	45·4	21	2	874
	Wiluna ...	29·898	29·844	30·317	29·646	86·5	60·3	73·4	104·8	41·0	92·7	63·3	107·2	38·5	3	1	686
	Cue ...	29·938	29·906	30·338	29·636	90·2	59·0	74·6	102·2	45·0	93·1	62·7	108·2	45·0	*Nil*	...	775
	Murgoo ...	...	...	...	...	84·8	59·2	72·0	100·0	51·0	...	...	...	...	*Nil*	...	822
	Yalgoo ...	29·963	29·928	30·359	29·667	86·1	56·6	71·4	101·8	45·4	90·6	59·0	107·7	42·8	*Nil*	...	828
	Nunngarra ...	29·945	...	30·434	29·596	86·8	56·2	71·5	103·0	42·5	...	...	...	...	2	1	647
	Lawlers ...	29·965	29·905	30·330	29·700	86·0	59·0	72·5	104·0	40·0	90·7	63·3	105·4	41·1	*Nil*	...	812
	Laverton ...	29·944	29·928	30·406	29·607	85·5	58·7	72·1	105·0	40·2	90·0	62·5	105·6	42·7	28	2	807
	Menzies ...	29·930	29·926	30·402	29·580	83·6	55·8	69·7	102·2	37·0	88·4	60·2	105·9	39·3	*Nil*	...	655
	Kanowna ...	...	...	...	...	81·2	53·5	67·4	101·0	37·5	82·3	56·8	106·1	40·3	97	4	984
	Kalgoorlie ...	29·983	29·952	30·417	29·579	81·9	54·0	68·0	101·8	38·0	86·7	58·2	107·8	40·6	21	3	981
	Coolgardie ...	30·006	29·952	30·434	29·630	80·3	51·9	66·1	100·9	37·0	86·2	56·7	107·1	39·3	10	5	1,140
	Southern Cross	29·982	29·949	30·440	29·590	83·3	50·8	67·0	102·2	35·4	87·3	55·1	109·5	37·8	12	3	927
	Kellerberrin ...	...	...	...	...	...	...	...	...	..	...	...	...	...	3	2	1,172
	Walebing ...	...	...	...	...	79·6	49·8	64·7	95·2	38·0	90·8	52·3	108·8	36·4	25	4	2,326
	Northam ...	...	...	...	...	80·7	51·2	66·0	96·5	37·0	83·8	53·6	109·1	38·3	1	1	1,953
	York ...	30·036	30·004	30·494	29·700	80·1	50·2	65·1	95·4	36·0	82·8	52·5	110·2	39·2	5	5	1,918
	Guildford ...	...	...	...	...	76·7	53·0	64·8	91·0	39·1	79·4	55·0	106·2	40·7	28	6	3,910

The Climate of Western Australia during November, 1907—*continued.*

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						November, 1907.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
SOUTH-WEST AND SOUTH COAST :	Perth Gardens	30 062	30 026	30·466	29·674	75·3	55 3	65 3	89 0	42·7	78·6	57·1	102·1	44·0	36	6	3,787
	Perth Observatory ...	30 076	30·033	30·491	29·700	71·7	55·1	64·4	87·9	43·4	74·9	56·4	100 9	42·0	46	6	4,005
	Fremantle	30·088	30 043	30·492	29·755	69·8	56·3	61·0	86·0	44·0	72·2	58·1	98·6	42·5	20	4	3,624
	Rottnest	30·077	30·025	30·491	29·753	69·4	56·9	63·2	83 0	43·0	70·9	59·1	96·2	48·6	9	3	2,710
	Mandurah	...	...	...	...	74·0	51·4	62·7	85·7	37·0	75·9	54·1	98·4	36·9	30	3	4,537
	Marradong	...	...	...	...	..	...	...	..	...	...	...	...	...	37	4	2,876
	Wandering	...	...	...	...	75 5	44·4	60·0	92 0	30·3	77·9	46·9	102·6	35·8	42	5	2,703
	Narrogin	...	...	...	...	...	...	...	. .	...	...	...	...	...	...	...	...
	Collie	...	...	...	...	74·4	45·6	60 0	88·0	32 2	75·7	48 2	99·8	35·9	93	7	3,702
	Donnybrook	...	...	...	...	73 2	47 9	60·6	86·0	35·9	75·1	50·1	97·3	36·8	102	5	4,248
	Bunbury	30·092	30 048	30·512	29·732	72·2	50 6	61·4	83·1	39·4	73·4	53·0	97·2	39·3	75	5	3,531
	Busselton	...	...	...	...	71·3	49 7	60·5	82·2	43·8	73·7	50·7	93·8	39·2	105	9	3,744
	Cape Naturaliste ...	30·091	...	30·505	29·678	65·7	51·7	58·7	72·2	44·0	...	...	...	...	106	9	3,995
	Bridgetown	...	...	...	...	74.3	45·3	59·8	86·9	32·0	75·1	47·1	98·0	35·2	79	8	3,518
	Karridale	30·094	30·054	30·485	29·661	68·2	49·8	59·0	79·4	37·0	70·1	52·1	95·0	38·0	242	11	5,449
	Cape Leeuwin	30·080	30·025	30·489	29·527	68·1	56·0	62·0	72 7	56·0	68·3	57·6	88·4	44·0	146	11	4,629
	Katanning	30·042	30 011	30·357	29·689	76 9	46·6	61·8	95·4	36·1	76·0	49·4	106·0	37·0	88	6	1,942
	Mt. Barker	...	...	...	...	67·7	46·8	57·2	84·8	36·2	...	...	...	...	148	12	3,189
	Albany	30·074	30·034	30·445	29·618	67·9	51·2	59·6	83·6	43·5	68·6	52·6	93·8	40·6	135	12	4,102
	Breaksea...	30·064	30 040	30·460	29·499	64·0	52·8	58·4	75·8	39·8	65·1	54·8	88·0	43·2	99	16	3,796
	Esperance	30·644	30·029	30·393	29·646	69·5	52·3	60·9	99·4	41·6	72·9	54·3	105·0	39·2	61	7	2,667
	Balladonia	30·002	29·968	30·338	29·590	78·0	50·0	64·0	100·0	37·0	80·0	50·8	106·4	39·5	78	6	940
	Eyre	29·971	30·030	30·238	29·467	74·3	53·4	63·8	104·4	42·2	73·4	54·0	108·1	34·5	65	7	999

INTERSTATE.

Locality.	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
Perth	30·076	30·033	30·491	29·700	73·7	55·1	64·4	87·9	43·4	74 9	56·4	100·9	42·0	46	6	4,005
Adelaide	29 965	30·003	30·375	29·490	80·0	56·2	68 1	100·0	46·9	79·0	55·4	113·5	40·9	148	9	1,803
Melbourne	29 969	29·875	30·432	29·446	75·2	52·8	64·0	94 8	44·3	71·3	50·9	105·7	36·5	234	8	1,663
Sydney	30·070	29·981	30·981	29·470	73·0	60·0	66·5	84·0	55·0	74·2	59·6	102·7	46·2	202	8	2,954

* Averages for three years only.

The Observatory, Perth, 10th December, 1907.

W. E. COOKE, Government Astronomer.

RAINFALL for October, 1907 (completed as far as possible), and for November, 1907 (principally from Telegraphic Reports).

Stations.	October, 1907.		November, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
East Kimberley:				
Wyndham	17	4	150	4
Carlton	...	...	...	...
Ivanhoe	...	...	...	...
Argyle Downs	...	...	...	...
Rosewood Downs	...	...	...	...
Lisadell	...	...	...	...
Turkey Creek	89	6	264	10
Ord River	...	...	...	...
Alice Downs	...	...	...	...
Flora Valley	...	...	...	...
Hall's Creek	47	2	124	3
Nicholson Plains	...	...	...	...
Ruby Plains	...	...	...	...
Denison Downs	...	...	...	...
West Kimberley:				
Mt. Barnett	...	...	...	...
Mt. House	...	...	...	...
Leopold Downs	...	...	...	...
Fitzroy Crossing (P.O.)	*Nil*	...	10	1
Brooking	...	...	...	...
Cherrabun	...	...	...	...
Bohemia Downs	...	...	...	...
Quanbun	...	...	...	...
Nookanbah	...	...	...	...
Upper Liveringa	...	...	...	...
Yeeda	...	...	...	...
Derby	*Nil*	...	*Nil*	...
Pt. Torment	...	...	...	...
Obagama	...	...	...	...
Beagle Bay	...	...	...	...
Broome	*Nil*	...	*Nil*	...
Thangoo	*Nil*	...	...	...
La Grange Bay	*Nil*	...	*Nil*	...
Rollah	*Nil*	...	...	...
N.W. Coast:				
Anna Plains	...	...	...	...
Wallal	*Nil*	...	*Nil*	...
Condon	*Nil*	...	*Nil*	...
DeGrey River	...	...	...	...
Port Hedland	*Nil*	...	*Nil*	...
Boodarie	*Nil*	...	...	...
Whim Creek	*Nil*	...	*Nil*	...
Mallina	...	...	...	...
Croydon	*Nil*	...	...	...
N.W. Coast—*contd.*				
Woodbrooke	...	...	...	...
Cooyapooya	...	...	...	...
Roebourne	*Nil*	...	*Nil*	...
Cossack	*Nil*	...	*Nil*	...
Fortescue	*Nil*	...	*Nil*	...
Mardie	*Nil*	...	...	...
Chinginarra	*Nil*	...	...	...
Yarraloola	...	...	...	...
Peedamullah	*Nil*	...	...	...
Onslow	*Nil*	...	*Nil*	...
Point Cloates	...	...	...	...
N.W. Inland:				
Ethel Creek	*Nil*	...	...	...
Warrawagine	*Nil*	...	...	...
Eel Creek	...	...	...	...
Muccan	...	...	...	...
Ettrick	...	...	...	...
Strelly	...	...	...	...
Carlinda	*Nil*	...	...	...
Mulgie	*Nil*	...	...	...
Warralong	*Nil*	...	...	...
Coongon	...	...	...	...
Talga	...	...	...	...
Bamboo Creek	*Nil*	...	*Nil*	...
Moolyella	...	...	...	...
Marble Bar	*Nil*	...	*Nil*	...
Warrawoona	*Nil*	...	*Nil*	...
Corunna Downs	*Nil*	...	...	...
Mt. Edgar	...	...	...	...
Nullagine	*Nil*	...	*Nil*	...
Balfour Downs	*Nil*	...	...	...
Bonny Downs	*Nil*	...	...	...
Middle Creek	*Nil*	...	...	...
Mosquito Creek	...	...	...	...
Roy Hill	*Nil*	...	...	...
Bamboo Springs	*Nil*	...	...	...
Kerdiadary	...	...	...	...
Woodstock	*Nil*	...	...	...
Yandyarra	...	...	...	...
Station Peak	...	...	...	...
Mulga Downs	...	...	...	...
Mt. Florence	*Nil*	...	...	...
Tambrey	*Nil*	...	...	...
Tableland	*Nil*	...	...	...
Millstream	*Nil*	...	...	...

RAINFALL—*continued.*

STATIONS.	OCTOBER, 1907.		NOVEMBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
N.W. INLAND—*contd.*				
Red Hill ...	...	...	...	...
Mt. Stewart ...	...	...	...	...
Coorara	*Nil*	...	...	...
Peake Station ...	...	...	...	...
Nanutarra ...	...	...	...	...
Yanrey	*Nil*	...	*Nil*	...
Wogoola ...	...	...	...	...
Towara	*Nil*	...	...	...
Woodbrook ...	*Nil*	...	...	...
GASCOYNE:				
Winning Pool ...	*Nil*	...	12	1
Coordalia ...	...	...	...	...
Wandagee ...	...	...	...	..
Williambury ...	...	...	...	...
Yanyeareddy ...	*Nil*	...	...	...
Maroonah ...	...	...	...	...
Ullawarra ...	...	...	...	...
Mt. Mortimer ...	...	...	...	...
Edmunds ...	...	...	...	...
Gifford Creek ...	...	...	...	...
Bangemall ...	...	...	...	...
Mt. Augustus ...	...	...	...	...
Upper Clifton Downs	...	...	...	...
Clifton Downs ...	*Nil*	...	...	...
Mearerbundie ...	...	...	...	...
Byro	*Nil*	...	...	...
Meedo	6	1	...	...
Minnie Creek ...	*Nil*	...	...	...
Bintbolya ...	...	...	...	...
Lyon's River ..	*Nil*	...	...	...
Mangaroon ...	...	...	...	..
Booloogooroo ...	*Nil*	...	...	...
Junction Station	*Nil*	...	...	...
Doorawarrah ...	...	...	...	...
Brick House ..	*Nil*	...	...	...
Boolathana ...	15	1	...	...
Carnarvon ...	2	1	*Nil*	...
Point Charles ...	2	2	...	...
Dirk Hartog ...	...	...	...	...
Sharks Bay ...	6	2	*Nil*	...
Wooramel ...	8	2	*Nil*	...
Hamelin Pool ...	10	3	*Nil*	...
Kararang ...	...	...	..	...
Tamala	...	...	...	...
YALGOO DISTRICT:				
Woolgorong ...	*Nil*	...	...	...
New Forest ...	...	...	...	...
Yuin	...	...	...	...
Pindathuna ...	*Nil*	...	...	...
Tallyrang ...	*Nil*	...	*Nil*	...

STATIONS.	OCTOBER. 1907.		NOVEMBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
YALGOO DISTRICT—*contd.*				
Bindoo	89	3	6	3
Mullewa ...	38	4	*Nil*	...
Kockatea ...	49	5	..	...
Barnong ...	15	1	...	...
Gullewa	8	1	*Nil*	...
Gullewa House...	10	1	*Nil*	...
Gabyon	*Nil*	...	...	...
Mellenbye ...	4	1	...	..
Wearagaminda...	8	1	*Nil*	...
Yalgoo	6	2	*Nil*	...
Wagga Wagga ...	...	...	...	..
Muralgarra ...	17	1	...	...
Golden Grove ...	5	2	...	...
Burnerbinmah ...	*Nil*	...	...	...
Nalbara	7	4	*Nil*	...
Wydgee	43	1	21	1
Field's Find ...	*Nil*	...	*Nil*	...
Thundelarra ...	...	...	...	...
Ninghan ...	...	...	...	...
Condingnow ...	...	...	...	...
163-Mile ...	*Nil*	...	...	...
Palaga Rocks ...	8	1	3	1
126-Mile ...	*Nil*	...	...	...
90-Mile	27	...	12	...
Wilgoyne ...	...	...	...	...
Mt. Jackson ...	·7	1	*Nil*	...
MURCHISON:				
Wale	...	...	...	...
Yallalonga ...	...	...	...	...
Billabalong ...	...	...	...	...
Twin Peaks ...	...	...	...	...
Murgoo	4	1	*Nil*	...
Wittenoom ...	...	...	...	...
Meka	9	1	*Nil*	...
Wooleane ...	9	2	...	...
Boolardy ...	*Nil*	...	...	...
Yederadda ...	*Nil*	...	...	...
Woogorong ...	...	...	...	...
Manfred ...	*Nil*	...	...	...
Yarra Yarra ...	...	...	...	..
Milly Milly ...	*Nil*	...	...	...
Berringarra ...	...	...	...	...
Miloura	*Nil*	...	...	...
Mindoolah ...	*Nil*	...	...	...
Mt. Gould ...	*Nil*	...	...	...
Moorarie ...	...	..	...	...
Peak Hill ...	4	1	21	2
Mebian	20	1	...	...
Minderoo ...	...	...	...	...
Abbotts	*Nil*	...	*Nil*	...
Belele	*Nil*	...	...	...

RAINFALL—*continued.*

STATIONS.	OCTOBER, 1907.		NOVEMBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
MURCHISON—*contd.*				
Gabanintha	*Nil*	...	*Nil*	...
Bungalow	*Nil*	...	*Nil*	...
Quinns	...	...	...	...
Nannine	*Nil*	...	7	1
Annean	*Nil*	...	...	...
Tuckanarra	*Nil*	..	*Nil*	...
Coodardy	18	1	...	...
Austin Downs	*Nil*	...	32	1
Cue	6	2	*Nil*	...
Day Dawn	2	1	*Nil*	...
Lake Austin	*Nil*	...	*Nil*	...
Lennonville	2	1	*Nil*	...
Mt. Magnet	*Nil*	...	5	1
Youeragabbie	*Nil*	...	*Nil*	...
Murrum	*Nil*	...	...	...
Challa	4	1	...	...
Nunngarra	6	1	2	1
EAST MURCHISON:				
Gum Creek	*Nil*	...	...	...
Dural	...	...	...	...
Wiluna	*Nil*	...	3	1
Mt. Sir Samuel	9	1	*Nil*	...
Leinster	8	1	11	1
Lawlers	2	1	*Nil*	...
Wilson's Patch	14	1	...	...
Poison Creek	8	1	...	...
Lake Darlôt	5	1	..	...
Darda	5	1	*Nil*	...
Salt Soak	15	1	...	...
Erlistoun	30	1	...	...
Mulga Queen	10	2	4	2
NORTH COOLGARDIE GOLDFIELDS:				
Laverton	21	1	28	2
Mt. Morgans	31	2	22	2
Murrin Murrin	30	1	31	1
Mt, Malcolm	2	1	7	1
Mt. Leonora	3	1	*Nil*	...
Tampa	...	...	...	...
Kookynie	6	1	10	2
Niagara	4	1	10	3
Yerilla	...	...	...	...
Yundamindera	48	1	19	2
Mt. Celia	*Nil*	...	..	...
Edjudina	28	1	...	...
Quandinnie	*Nil*	...	..	...
Menzies	25	1	*Nil*	...
Mulline	17	1	26	3
Mulwarrie	15	1	36	3
Goongarrie	17	1	17	1

STATIONS.	OCTOBER, 1907.		NOVEMBER, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
COOLGARDIE GOLDFIELDS:				
Waverley	*Nil*	...	46	1
Bardoc	11	1	37	2
Broad Arrow	11	1	36	4
Kanowna	9	1	97	4
Kurnalpi	*Nil*	...	40	3
Bulong	11	1	148	3
Kalgoorlie	5	1	21	3
Coolgardie	15	2	60	5
Burbanks	49	2	94	4
Bulla Bulling	63	1	27	1
Woolubar	...	...	...	...
Waterdale	33	2	24	3
Widgiemooltha	7	3	55	7
15-Mile Condenser	*Nil*	...	36	1
50-Mile	93	...	...	...
Norseman	30	1	90	5
Lake View	20	2	...	...
Frazer Range	109	1	...	...
Southern Hills	...	...	36	1
YILGARN GOLDFIELDS:				
129-Mile	10	1	37	3
Emu Rocks	10	1	31	3
56-Mile	43	...	25	...
Glenelg Rocks	13	1	27	3
Burracoppin	23	2	10	1
Bodallin	*Nil*	...	...	...
Southern Cross	3	1	12	3
Parker's Range	7	1	...	...
Yellowdine	*Nil*	...	27	2
Karalee	...	...	...	...
Koorarawalyee	*Nil*	...	...	...
Boorabbin	3	1	20	3
SOUTH-WEST (NORTHERN DIVISION):				
Murchison House	57	5	*Nil*	...
Mt. View	16	1	*Nil*	...
Mumby	72	6	*Nil*	...
Willow Gully	32	6	5	1
Northampton	91	4	*Nil*	...
Chapman Experimental Farm	53	5	...	...
Narratarra	...	...	...	...

RAINFALL—*continued.*

Stations.	October, 1907.		November, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (NORTHERN DIVISION)—*contd.*				
Oakabella ...	...	...	...	...
White Peak ...	...	...	...	...
Geraldton ...	20	7	3	1
Hinton Farm ...	...	...	...	...
Tibradden ...	...	..	...	...
Myaree	78	7	...	...
Sand Springs ...	...	...	...	...
Nangetty ...	21	4	...	...
Greenough ...	53	4	5	1
Bokara	22	2	...	...
Dongara ...	28	3	1	1
Strawberry ...	75	11	9	2
Yaragadee ...	25	1	4	1
Urella	36	3	*Nil*	...
Opawa	36	8	4	2
Manara	30	4	*Nil*	...
Mingenew ...	49	7	4	1
Yandenooka ...	51	3	...	...
Arrino	*Nil*	..		...
Three Springs ...	29	7	3	2
Carnamah ...	35	5	4	1
Hill River ...	137	10	18	2
Jun Jun	19	1	...	...
Watheroo ...	39	4	9	3
Nergaminon ...	...	...	...	...
Dandaragan ...	93	9	32	4
Yatheroo ...	110	9	*Nil*	..
Moora	62	7	33	4
Walebing ...	101	11	25	4
Round Hill ...	51	10	14	4
New Norcia ...	129	12	18	3
Wongon Hills ...	78	10	3	3
Wannamel ...	97	10	21	8
Gingin	170	12	18	4
SOUTH-WEST (METROPOLITAN):				
Wanneroo ...	223	13	30	3
Belvoir	255	11	27	4
Wandu	256	21	38	6
Mundaring ...	342	12	25	3
Canning Waterworks	322	17	45	6
Kalbyamba ...	...	...	...	...
Guildford ...	248	16	28	6
Perth Gardens ...	259	19	36	6
Perth Observatory	289	17	46	6
Highgate Hill ...	280	14	41	6
Subiaco	263	16	34	6

Stations.	October, 1907.		November, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST (METROPOLITAN)—*cont.*				
Claremont ...	...	...	...	14
Fremantle ...	216	18	20	4
Rottnest... ...	134	13	9	8
Rockingham ...	301	17	67	4
Jandakot ...	298	15	32	4
Armadale ...	236	14	...	...
Jarrahdale ...	498	14	69	4
Jarrahdale (The Chestnuts)	342	9	71	4
Serpentine ...	311	13	53	5
EXTREME SOUTH-WEST:				
Mandurah ...	311	18	30	3
Pinjarra (Blythewood)	311	18	79	6
Pinjarra ...	393	17	52	4
Upper Murray ...	550	18	...	...
Yarloop	557	18	115	6
Harvey	569	18	90	4
Brunswick ...	647	12	...	...
Collie	385	15	93	7
Glen Mervyn ...	469	10	104	4
Donnybrook ...	497	19	102	5
Boyanup ...	508	19	112	7
Bunbury ...	429	17	75	5
Elgin	503	20	94	5
Busselton ...	423	20	105	9
Quindalup ...	456	18	161	7
Cape Naturaliste	373	20	106	9
Glen Lossie ...	442	21	139	8
Karridale ...	470	19	242	11
Cape Leeuwin ...	355	23	146	11
Lower Blackwood	589	18	...	...
Ferndale ...	615	20	99	7
Greenbushes ...	682	19	96	5
Cooeearup ...	545	22	86	9
Bridgetown ...	480	20	79	8
Hilton	429	...	...	...
Greenfields ...	370	11	74	4
Denninup ...	355	15	...	...
Cundinup ...	247	7	...	...
Wilgarrup ...	611	17	109	8
Balbarrup ...	646	17	...	...
Bidellia ...	642	12	234	8
Westbourne ...	452	16	...	...
Deeside	570	18	177	9
Riverside ...	539	17	141	8
Mordalup ...	...	...	...	...
Lake Muir ...	500	15	168	8

RAINFALL—*continued.*

Stations.	October, 1907.		November, 1907.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Eastern Agricultural Districts:				
Kokardine ...	25	5	8	2
Walgo	59	7	...	...
Dowerin ...	42	4	5	1
Uberin	69	5	...	...
Cow-cowing ...	...	...	...	...
Ejanding ...	29	3	7	1
Hatherley ...	...	...	...	...
Momberkine ...	65	5	....	...
Eumalga . .	82	8	...	...
Newcastle . .	77	9	*Nil*	...
Craiglands ...	215	12	29	4
Eadine	95	9	11	2
Chidlow's Well ...	303	15	38	5
Baker's Hill ...	177	9	...	...
Berry Brow ...	134	9	*Nil*	...
Northam ...	65	9	1	1
Grass Valley ...	68	2	...	...
Cobham	134	14	2	1
York	86	11	5	5
Burrayocking ...	47	7	10	2
Meckering ...	19	2	5	1
Cunderdin ...	...	...	...	...
Doongin	10	3	...	...
Whitehaven ...	40	6	...	...
Mt. Caroline ...	40	4	...	...
Quailing .	34	8	3	1
Cutenning ...	19	6	.	...
Kellerberrin ...	21	3	3	2
Cardonia ...	20	4	...	...
Baandee ...	10	1	...	...
Nangeenan ...	5	1	4	1
Merredin ...	22	3	4	1
Walgormouring	40	5	...	...
Codg-Codgen ...	26	5	...	...
Noongarin ...	11	1	...	...
Mangowine ...	45	3	...	...
Yarragin ...	...	...	...	...
Koomberkyne ...	73	12	19	6
Great Southern Railway Line:				
Dalebridge ...	74	7	...	...
Beverley ...	107	11	7	1
Brookton ...	106	11	...	...
Sunning Hill ...	124	15	10	4
Pingelly ...	86	10	8	2
Yornaning ...	105	13	28	5
Narrogin ...	122	13	21	4
Narrogin State Farm	84	7	...	...
Great Southern Railway Line—*contd.*				
Rose Hill ...	56	4	...	...
Wagin	62	9	12	3
Katanning ...	107	8	88	6
Sunnyside ...	138	10	49	6
Broomehill ...	123	10	72	6
Woodyarrup ...	115	7	46	3
Pallinup ...	129	9	...	...
Tambellup ...	...	...	...	...
Toolbrunup ...	67	6	71	6
Cranbrook ...	202	14	82	7
Stirling View ...	162	13	98	6
Kendenup ...	374	16	154	11
Woogenellup ...	170	18	..	...
St. Werburgh's...	377	19	149	13
Mt. Barker ...	346	19	148	12
West of Great Southern Railway Line:				
Talbot House ...	115	12	11	1
Jelcobine ...	120	10	11	2
Bannister ...	...	...	...	...
Wandering ...	136	11	42	5
Glen Ern ...	...	...	...	...
Marradong ...	163	16	47	4
Wonnaminta ...	130	12	...	...
Williams ...	123	10	27	3
Darkan	...	...	...	...
Arthur River ...	95	9	35	4
Gainsborough ...	35	2	...	...
Glenorchy ...	161	6	...	...
Kojonup ...	144	5	32	2
Northumberland Homestead	305	15	91	8
Blackwattle ...	532	12	...	...
Warriup ...	237	16	115	12
Forest Hill ...	541	21	186	15
East of Great Southern Railway Line:				
Oakdale	79	5	...	...
Barrington ...	...	...	...	...
Bally Bally ...	93	9	...	...
Stock Hill ...	93	6	*Nil*	...
Qualin	91	9	22	5
Woodgreen ...	...	...	...	...
44-Mile	100	5	...	...
Peakaring ...	...	...	...	...

RAINFALL—*continued.*

Stations.	October, 1907.		November, 1907.		Stations.	October, 1907.		November, 1907.	
	No. of Points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.		No. of points. 100 = 1in.	No. of wet days.	No. of Points. 100 = 1in.	No. of wet days.
East of Great Southern Railway Line—*contd.*					South Coast—*contd.*				
					Woodburn ...	...	...	...	...
					Cape Riche ...	101	6	...	...
Glenallan ...	96	10	15	4	Peppermint Grove	198	7	...	...
Gillimanning ...	73	7	...	...	Bremer Bay ...	202	6	158	7
72-Mile	127	5	...	..	Cocoonarup ...	25	5	95	11
Wickepin ...	...	...	...	...	173-Mile ...	13	...	145	5
Crooked Pool ...	101	7	2	1	Ravensthorpe ...	15	5	165	11
Nallyring ...	121	10	31	8	Hopetoun ...	77	4	166	7
Yardup ...	115	6	78	7	Fanny's Cove ...	44	3	...	...
Bunking ...	73	4	...	...	Park Farm ...	83	10	...	..
Dyliabing ...	75	8	.	.	Grass Patch ...	62	4	...	...
Glencove ...	91	11	24	4	Swan Lagoon ...	35	2	88	6
Cherillalup ...	67	6	25	4	30-Mile	30	2	123	7
Strathavon ...	97	12	53	6	Gibson's Soak ...	44	4	158	7
Warperup ...	124	14	71	8	Myrup	105	10	103	6
Woolganup ...	82	7	...	...	Esperance ...	165	10	61	7
Chillinup ...	160	3	. .	...	Boyatup	211	9	...	. .
Jarramongup ...	50	1	. .	..	Lynburn ..	160	10	...	...
South Coast:					Point Malcolm ...	111	9	...	...
Wilson's Inlet ...	631	21	142	10	Israelite Bay ...	61	8	216	8
Grasmere ...	607	20	147	11	Balbinia	54	2	..	.
King River ...	422	12	...	...	Nannambinia ...	...	...	..	...
Albany	589	20	135	12	Balladonia ...	50	1	78	6
Point King ...	592	16	123	6	Eyre	2	1	65	7
Breaksea ...	428	24	99	6	Eucla	23	3	172	7

The Observatory, Perth,
10th December, 1907.

W. E. COOKE,
Government Astronomer.

By Authority: Fred. Wm. Simpson, Government Printer, Perth.